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VOL. I.

THE ELECTRIC LIGHT.

Before entering on this subject it may not be irrelevant here to call attention to an axiom in the theory of light produced by chemical action, viz.: that its production depends on two conditions: first, that there must be solid particles in a condition capable of taking up the velocity; and, secondly, chemical action to impart the velocity to them. For instance, in the lime light we have the combination of hydrogen and oxygen which produces of itself but very little useful light, as it is purple; but when the combined flames are made to play on a piece of lime, the heat produced by the combining gases sublimates the lime, and then the particles or atoms floating in the flame produce an intense white light.

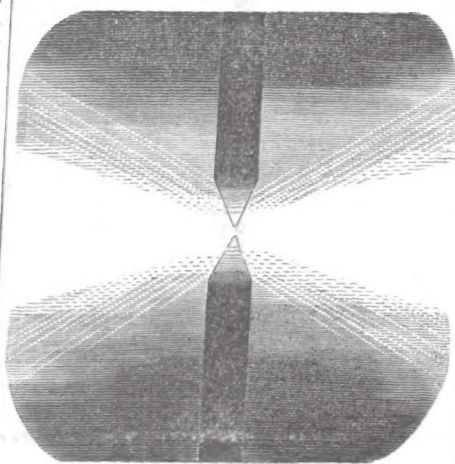
In the oil-lamp the hydrogen of the oil unites first with the oxygen of the air, and during this combination the particles of liberated carbon are floating in the combining gases as the particles of the lime were in the former instance; but, as the combination in this case is not nearly so violent, or rather as the velocity of the combining hydrogen and oxygen is not so great, the light produced is less intense. As, therefore, electricity exceeds all other means of giving velocity to such particles, so must the light it gives be of greater intensity than all other known lights.

As this light is now in use on both sides of the Channel, it may be well, before describing those in operation at the great Paris Exhibition, to remind our readers of its origin. In 1831 that great and modest man Faraday announced to the world his grand discovery—viz., that whenever the magnetic force in a soft piece of iron or steel is being increased or diminished a current of electricity will be induced in a coil of insulated wire wound round such piece of soft iron or steel; to this discovery was soon added the knowledge that the force of the electric current thus produced is proportional to the magnitude of the increase or diminution divided by the time in which the change takes place; and, further, that the current thus produced is modified by the length and size of the wires employed being changed from a current that will melt a large iron wire on passing through it, but which at the same time will pass through the human frame unfelt, to a current that will not warm a small wire, but which will or can cause instant death to any living creature. The object, therefore, of the arrangement of all the parts is, first, to arrive at a maximum of electricity from a given weight of magnets, and, secondly, to modify the current in the coils, so that the shock shall be trifling, but the intensity great enough to produce a permanent light.

The application of the immortal Faraday's discovery to the purposes of coast illumination is solely due to the scientific attainments and great mechanical skill of Professor Holmes, whose indefatigable perseverance for more than a quarter of a century resulted in the magnificent light which was first shown from the South Foreland in August, 1858, was permanently placed at Dungeness, and has since been brought into use at Cape La Heve, to light the entrance to the River Seine, and will, moreover,

shortly be shown from a lighthouse in the course of erection on the coast of Yorkshire. The great Paris Exhibition has afforded world-wide opportunities of witnessing its splendid effect.

In the electric light first experimentally used by



the lighthouse authorities at the South Foreland and finally placed at Dungeness, the arrangement is as follows—viz., there are three concentric rings of magnets, and between the poles of those forming the first and second rings, and also those forming the second and third rings, the rims of two brass wheels revolve. The rims of these wheels are hollow, and contain the "helices" or "bobbins," but the soft iron cores round which the wire of the bobbins is wound are screwed into the sides of the hollow rims, and are turned off flush on the outside. The wires of all the helices or bobbins are connected together in series in the rim of each wheel, and the terminal wires are carried down behind the panel to four screws, two of which screws receive the wires for each wheel. These wires are carried through the hollow axle of the wheel to the outside of the bearing, and are there joined to their respective commutators. The commutators are contrivances by which the alternating currents of electricity induced in the helices are directed, and thus the entire current passes from the machine in one direction, instead of alternating, and forms a constant current.

The magneto electric machine in the English portion of the Exhibition in Paris differs from that at Dungeness simply in this—that each machine consists of six brass wheels, every wheel having sixteen helices of insulated copper wire. Inside each helix is placed a hollow core of soft iron; the wheels are all firmly fixed on a shaft, which is driven by an Allen steam-engine. The horseshoe magnets are placed in rings of eight in each ring, with their sixteen poles in the same plane pointing inwards towards the axle, and so adjusted that the distance from centre to centre of the poles is exactly equal to the distance from centre to centre of the cores of the helices. The magnets are so arranged that, whether counting the poles around one ring, or counting longitudinally through the seven rings, the poles are

alternately north and south poles. In each machine there are ninety-six helices and fifty-six magnets. The intensity of current depends on the length of the wire throughout the connected series of helices; the quantity of electricity depends on the quantity of magnetism induced in the soft iron cores, and on the velocity with which this quantity is taken up at each reversal of the poles. Experience of this engine shows us that 6400 changes of polarity per minute give the best result for light. No wood is employed in the English machine. The electric current is conducted through the wires to the lantern, where it passes alternately through the carbons, and at the points of these, when nearly in contact, the effect described at the opening of this subject occurs (see engraving), and the most brilliant light known is the result.

The English and French electro-machines now in operation at the Paris Exhibition, though differing in construction, are the same in principle; so is the motive power, only that the French use the driving strap, whereas our electric-engine is worked by the direct action of the steam-engine; experience alone can prove which will turn out the most efficient. The English light is shown in a fixed lens, because the position it is intended to occupy on the east coast of England is that of a fixed light; and, however glad the lighthouse authorities would have been to test the great increase of power a revolving lens would have imparted to it, they had no such lens ready to experiment with. The result obtained in the fixed lens has proved a great success. Viewed from the hills surrounding Paris, the long-wished-for opportunity of testing the effect of the electro-magnetic light against the ordinary dioptric system is afforded by the beautiful revolving first order dioptric light intended for the Roches Douvres and shown from the fine iron lighthouse built for those rocks and placed in the French section of the park. This induced the English authorities to put up a rough scaffolding, on which, at a height of 145 feet, and nearly on a level with the French dioptric revolver, their electric light is exhibited. Had the French electric one been at a similar elevation, there can be no doubt that the powerful concentration into one beam of those rays which in a fixed light are scattered round the horizon would have been made amply manifest; nothing, however, could be more beautiful or dazzling than the effect of the French electric light already described, shown as it is at an elevation of only a few feet from the ground, through alternating colored lenses. I may take this opportunity, in the name of my colleagues and myself, of offering our tribute of thanks to M. Leonce Reynaud, Inspecteur General des Ponts et Chaussées, for his kind courtesy in affording information on every subject connected with his department of this beautiful exhibition. Whatever rivalry there is here is an international and honorable rivalry of science and art, and one that can only result in the good of our fellow-creatures.

The French electric light, or rather two lights, exhibited from the windows of a small building in the park, differs from the Dungeness one in that, whilst the latter consists of three rings of magnets, with

their poles outwards, radiating from the centre, each ring consisting of twenty magnets or forty poles, the French machine has seven rings of eight magnets each, or sixteen poles (i. e., 112 in all), the poles of the magnets turning inwards; between these turn six wheels, each containing in its periphery sixteen helices. The maximum intensity of light is attained by a speed of from 350 to 400 rotations per minute, whereby the electric current is inverted about 100 times in a second. Another difference between the French machine and the Dungeness one is due to an improvement of M. van Maldern, and consists in doing away altogether with the commutators. The magnets in the French machine are of a power of about 60 kilog. each. There are two engines and two electric lamps; the second engine is used in hazy weather to augment the intensity of the light, or in case of accident to the other engine. This light, like our own, is furnished with magneto-electric clockwork, which regulates the movements of the carbons; these, however, require constant watching. Although the electric current passes alternately through each of the carbon pencils, it is found that the lower one burns away more rapidly than the upper one in a ratio of about 108 to 100, necessitating a very delicate and intricate arrangement of the clockwork and frequent manipulation.

Calcium.

Calcium is the metallic base of lime, and was obtained by Sir Humphry Davy from that material by means of galvanic agency. During the process the product was received in a vessel filled with naphtha, in which it was excluded from oxygen, and consequently it retained its metallic appearance, which resembles that of silver. If atmospheric air be admitted to it, it absorbs oxygen rapidly, burns with an intense white light, and reproduces lime, which is an oxide of calcium. The name of the metal is derived from *calx*, the Latin word for lime.

As obtained by the fusion of sodium with iodide of calcium, it is a light yellow metal, which is very malleable, and slowly decomposes water at ordinary temperatures. It enters into combination with oxygen, chlorine, bromine, iodine, and sulphur, when heated with them.

Calcium appears to enter into the composition of nearly all pig-irons, but not directly, and although found in cast-iron, has not been found in wrought-iron. It behaves in regard to iron very much like the alkaline metals, and, like them, does not possess sufficient fixity to enter largely into combination with iron, and is thought to injure the quality of that metal to some extent. A sample of cold-blast iron with a high yield of limestone flux gave 0.95 per cent. of calcium, while a hot-blast white iron afforded only 0.20 per cent., being the smallest quantity observed. Although the presence of the calcium demonstrates the existence of a slight affinity between that metal and iron, the great bulk of calcium passes into the slag as lime.

The chloride of calcium, or chloride of lime, as it is more familiarly called, is a most important compound in the arts from its property of bleaching vegetable tissues; in the bleaching of linen, and in paper-making, the saving of time caused by the use of this substance is incalculable.

THERE is something very singular in the incidents attending the death of Mr. Lyle, Chief Engineer of the Philadelphia Fire Department. On Saturday afternoon he was alone counting some money in his office, when he suddenly died in his sitting posture, from an attack of apoplexy. All Saturday night, Sunday, and Sunday night he sat there dead, holding some United States bonds and bills in his hand; and not till Monday morning was he found by the woman who came to sweep out the office.

MR. VARLEY AND THE CABLE.

Mr. Varley's Connection with the Successful Atlantic Enterprise, Accompanied by Extracts from Printed Documents, and one Written Report to the Atlantic Telegraph Company.

At the early date of 1854, Mr. Varley pointed out at the British Association the way to obtain the requisite speed through an Atlantic cable (Vide Extracts No. 12 and 13).

In his patents of 1854, 1855 and 1856 will be found a description of the phenomena that would present themselves as soon as a long cable was made and how to mitigate the great difficulties arising from electrostatic induction (Vide Extract No. 6).

The extracts taken from Professor Thomson's evidence before the Committee appointed by the Privy Council and the Atlantic Telegraph Company, and of which Mr. Varley was a member, show that the only person who at that time used a rational method of testing cables was Mr. Varley, and that the method of determining the distances of faults which was beginning to dawn upon his (Prof. Thomson's) mind, were familiar to and habitually practised by Mr. Varley, whose apparatus and plans gave reliable indications of the locality of the fault in the first Atlantic cable (1858).

By an extract (Nos. 7 and 8) from the Right Hon. Stuart Wortley's statement to the shareholders of the Atlantic Telegraph Company, March, 1860, it will be seen that Mr. Varley had obtained great notoriety for the accuracy of his determinations of the position of faults, an untrodden field, in England at least.

From the extracts of his remarks at the public meeting in 1862 and 1864 (vide extracts No. 9 and 10) it will be seen that he was working hard to get a correct knowledge of the transmitting powers of an Atlantic cable—i. e., its commercial value.

For this purpose he constructed an artificial Atlantic cable, which enabled him to stake his reputation upon getting eight words per minute, and probably twelve or 13, all of which has been realized by the present cables.

When the cable in 1858 failed he was called in by the Atlantic Telegraph Company, and the late Mr. Robert Stephenson to ascertain what was the matter with it.

The electricians of the company said there was a fault in the harbor, while Professor Thomson said there was one a long way off (vide extract No. 1).

He quickly ascertained the nature of the fault.

In 1859 the Atlantic Telegraph Company was in extremes, they obtained the gratuitous assistance of Mr. Robert Stephenson, and he induced Mr. Varley to accept the office of Electrician to the Company, gratuitously, *trusting to the future for reward*.

Many who were considered authorities declared it was impossible to send electric currents 2,000 miles under the ocean.

After the failures in the Atlantic, the Mediterranean and the Red Sea, the public lost all confidence.

Few know what hard work he had to re-establish confidence in the ultimate success of the undertaking. He performed these duties gratuitously from 1859 to 1864, when the funds were at last raised for the 1865 cable.

He designed and tested (vide Extract 14, a, b & c) the whole of that cable on behalf of the Atlantic Telegraph Company, and went out in the Great Eastern with it, Prof. Thompson accompanying him as one of his assistants.

The Telegraph Construction and Main Company, after the failure in 1865, sought and obtained the professional services of these two gentlemen, as their consulting electricians.

They arranged the plans of testing for the last and successful expedition, and apparatus to be used for speaking through the cable, the latter being an

invention of Mr. Varley's, published in 1860 and 1862.

They decided that it was necessary for one of them to be at each end of the cable, and it was Thomson's lot to go out in the Great Eastern and Varley's to remain with Mr. Glass at Valencia.

It is hard then for him who had worked assiduously from 1859 to 1864 without any hope of reward *except in the future*, to find himself at the last moment overlooked, because duty as important as any on board ship called him this year to the Valencia end of the cable.

In 1863 he drew up the specifications for the cable, determined the dimensions of the conductor and insulator, &c. (vide extract No. 14, a, b & c), and in January, 1865, he wrote a letter to the Atlantic Telegraph Company, urging that the paddle wheels of the Great Eastern should be made to disconnect, as otherwise, if a fault compelled the great ship to remain stationary, she would cease to be under control and the cable be lost.

This recommendation, the result of long experience in cable repairs, was unfortunately not attended to till this year.

He it was who recommended (July, 1863) the use of homogeneous iron wire instead of steel, (vide extract No. 14 b), and also annealed instead of hard wire, and pointed that the resulting cable would be stronger.

The recommendations were all adopted this year, and success is the result.

Curious Electrical Phenomena.

Prof. Tyndall publishes the following account of some curious electrical phenomena observed by Mr. R. Watson and a party of tourists in ascending a portion of the Jung Frau Mountain in Switzerland. Mr. W. in a letter to Prof. Tyndall says:—

On the 10th of July I visited with a party of three and two guides, the *Col de la Jung Frau*. The early morning was bright, and gave promise of a fine day, but, as we approached the Col, clouds settled down upon it, and on reaching it, we encountered so severe a storm of wind, snow, and hail, that we were unable to stay more than a few minutes. As we descended, the snow continued to fall so densely that we lost our way, and for sometime, we were wandering up the Lotsch Sattel. We had hardly discovered our mistake when a loud peal of thunder was heard, and shortly after I observed that a strange singing sound, like that of a kettle, was issuing from my alpenstock. We halted, and finding that all the axes and stocks emitted the same sound, stuck them into the snow. The guide from the hotel now pulled off his cap, shouting that his head burned; and his hair was seen to have a similar appearance to that which it would have presented had he been on an insulated stool under a powerful electrical machine. We all of us experienced the sensation of pricking or burning in some part of the body, more especially in the head and face, my hair also standing on end in an uncomfortable but very amusing manner. The snow gave out a hissing as though a heavy shower of hail were falling; the veil on the wide awake of one of the party stood upright in the air, and on waving our hands, the singing sound issued loudly from the fingers. Whenever a peal of thunder was heard, the phenomena ceased, to be resumed before the echoes had died away. At these times we felt shocks more or less violent in those portions of the body which were most affected. By one of these, my right arm was paralyzed so completely that I could neither use nor raise it for several minutes, and I suffered much pain in it at the shoulder joint for several hours. At half-past twelve the clouds began to pass away and the phenomena finally ceased, having lasted twenty-five minutes. We saw no lightning, and were puzzled at first as to whether we should be afraid or amused.

Electricity and Salt.

Herr Schultz, of Berlin, announces to the French Academy of Sciences the theory that the electricity of the tissues of the human body results from the action of common salt, which is abundantly distributed through the system. He has found that the electricity is much more abundant when the proportion of salt present is large, than when it is small. He describes numerous experiments he has made confirming this theory. Thus animal electricity, or animal magnetism as it is generally called, is excited or generated by the introduction of salt into the system, and the quantity or power of this electricity is regulated by the quantity of salt used. In other words, our bodies are electrical batteries, and common salt is the proper agent to excite them to action. Here we have not only the key to the mysteries of animal magnetism, but one that, in the future, will open to our wondering and enraptured vision still greater mysteries. The more powerful batteries, it is well known, control the weaker ones, which accounts for the fact that only certain persons possess the power of magnetizing others.

Assuming this theory of Herr Schultz to be correct, it is easy to see that the magnetic relations of individuals to each other are under their own control. Salt is so cheap that we shall all be able to get up as much electrical steam as our batteries will carry. Bodily capacity to receive salt, and strength of the nervous system to carry the electricity, will constitute the only limits to our magnetic force, or personal magnetism. The Indians of this continent eat their food without salt, which fact doubtless accounts for their lack of personal magnetism compared with the whites. The phenomena of animal magnetism, as seen in the operations of professional magnetic mediums, afford us many useful hints which may be adopted to advantage in our present warfare with the aborigines. Our soldiers should be highly charged with electricity by a liberal mixture of salt with their rations, so that when they get near enough to the red men to use their superior electric power, they can paralyze the nerves of the Indians and subdue them without destroying, or even hurting them. This feature of the case ought to recommend this new system of tactics to our very humane Government.

There are many thoughtful and intelligent people who believe there is a close relationship between animal magnetism and spiritualism. Persons having magnetic control of others by means of their superior electrical power, seem to control not only the bodily but the mental action of the subjects under their influence. They exercise a will-power, as they term it, thus showing the mind and the body in magnetic communication. As a consequence, it is practicable to increase the electrical power of the brain as well as of the body by the simple use of common table salt. The human mind or spirit being immortal, those which have left their earthly for an ethereal abode, and have a sufficient supply of electricity for the purpose, can hold communication with the spirits of living bodies on earth, and thus convey to them the intelligence they desire. The theory of affinities which is adopted by spiritualists, may be readily accounted for by assuming that spirits obey the laws of electricity, different objects being attracted or repelled according to their individual magnetism.—*San Francisco Times, Oct. 17.*

The Stock Quoting Telegraph has been put in partial operation, and so far as we have seen, bids fair to be a success. It is one of those new uses of the telegraph which makes it more and more the indispensable servant of business men. By this new system the sales of the Stock Board are communicated as soon as made by automatic machinery in the offices of those who use it, in plain printed slips. We hope soon to give a full description of the process.

Electric Railroad Switches.

Speaking of accidents on railroads occasioned by the mistakes of switch tenders, the *Times* makes the following sensible comments:—

"These appalling accidents are sure to happen just so long as their prevention depends *alone* upon the care and vigilance of the switch tender. No amount of experience or trustworthiness seem sufficient to insure against them. In a recent fearful catastrophe the tender was regarded one of the most careful men on the road. He had been engaged at this responsible, although poorly paid and humble occupation for fifteen years, and never had been negligent before. Close by his hut and his switch he was allowed by the railroad authorities to raise a crop of potatoes. It was near nightfall and he was anxious to gather his harvest while daylight lasted. To switch off a freight train to let an express train pass he changed the switch, and not waiting to restore it hurried back to his potato patch. The express came thundering on, and \$150,000 worth of property and many lives were destroyed. An invention has been perfected and is now in successful operation on the New Haven Railroad at Bridgeport, which, by automatic action, goes far to prevent, if it does not entirely avoid, the occurrence of these railroad slaughters. This contrivance is simply an electric attachment to the switch-rail, which operates signals conveniently placed on the track and at the nearest station.

When the rail of the main track is moved to the switch line, the danger signal is communicated unerringly by this magnetic watchman in the display by its action of the usual warning, red disc by daylight and red lamp at night, while at the same time it sets a large gong in motion, which constantly sounds as long as the electric circuit is broken by the switch continuing open. The arrangement is regarded as simple, inexpensive and effective. It has received the hearty commendation and indorsement of the most distinguished scientific men, among whom are Prof. Doremus, of New York, and Profs. Bremer and Symar, of New Haven, and the officers of the New Haven road give to it after three months trial, their unqualified approval.

If so perfect and effective a contrivance as this electric switch is claimed to be, after careful investigation, shall not be promptly adopted by our railroad corporations, the sin of murder, so often imputed to them, may, with more justice be laid at their doors.

Secret Messages.

In 1680, when Monsieur de Louvois was French Minister of war, he summoned before him, one day, a gentleman named Chamilly, and gave him the following instructions:

"Start this evening for Basle, in Switzerland; you will reach it in three days; on the fourth, punctually at two o'clock, station yourself on the bridge over the Rhine, with a portfolio, ink, and a pen. Watch all that takes place, and make a memorandum of every particular. Continue doing so for two hours; have a carriage and post-horses awaiting you; and at four precisely, mount and travel night and day till you reach Paris. On the instant of your arrival, hasten to me with your notes."

De Chamilly obeyed; he reached Basle, and on the day and at the hour appointed, stationed himself, pen in hand, on the bridge. Presently a market-cart drives by, then an old woman with a basket of fruit passes; anon, a little urchin trundles his hoop by; next an old gentleman in blue top-coat jogs past on his gray mare. Three o'clock chimes from the cathedral-tower. Just at the last stroke, a tall fellow in yellow waistcoat and breeches saunters up, goes to the middle of the bridge, lounges over, and looks at the water; then he takes a step back and strikes three hearty blows on the footway with his staff.

Down goes every detail in De Chamilly's book. At last the hour of release sounds, and he jumps into his carriage. Shortly before midnight, after two days of ceaseless traveling, De Chamilly presented himself before the minister, feeling rather ashamed at having such trifles to record. Monsieur de Louvois took the portfolio with eagerness, and glanced over the notes. As his eye caught the mention of the yellow-breeched man, a gleam of joy flashed across his countenance. He rushed to the king, roused him from sleep, spoke in private with him for a few moments, and then four couriers who had been held in readiness since five on the preceding evening, were dispatched with haste. Eight days after the town of Strasbourg was entirely surrounded by French troops, and summoned to surrender; it capitulated and threw open its gates on the 30th of September, 1681. Evidently the three strokes of the stick given by the fellow in yellow costume, at an appointed hour, were the signal of the success of an intrigue concerted between Monsieur de Louvois and the magistrates of Strasbourg, and the man who executed this mission was as ignorant of the motive, as was Monsieur de Chamilly of the motive of his.

Now this is a specimen of the safest of all secret communications, but it can only be resorted to on certain rare occasions. When a lengthy dispatch is required to be forwarded, and when such means as those given above are out of the question, some other method must be employed. Herodotus gives us a story to the point: it is found also, with variations, in Aulus Gellius.

"Histieus, when he was anxious to give Aristagoras orders to revolt, could find but one safe way, as the roads were guarded, of making his wishes known: which was by taking the trustiest of his slaves, shaving all the hair from off his head, and then pricking letters upon the skin, and waiting till the hair grew again. This accordingly he did; and as soon as ever the hair was grown, he dispatched the man to Miletus, giving him no other message than this: 'When thou art come to Miletus, bid Aristagoras shave thy head, and look thereon.' Now the marks on the head were a command to revolt."

Patents.

71,863.—SELF-ADJUSTING RELAY-MAGNET.—J. M. Fairchild, New Haven, Conn., assignor to himself, J. K. Bundy, and J. M. Townsend, same place.

I claim the arrangement of the head C combined with the magnet, so as to be self-adjusting in relation to the armature, substantially as herein set forth.

71,624.—ELECTRIC CLOCK.—Samuel A. Kennedy, Attleborough, and S. W. Holt and Joseph Gerlach, Philadelphia, Pa.

We claim, 1. The combination and arrangement of two or more galvanometers with one or more polarized steel bars, combined with the pendulum, and arranged either above or below the centre of motion, substantially as described and for the purposes set forth.

2. Producing a double automatic circuit, by means of the combination of the pendulum H with the sliding bar L, arranged and operating in relation to the electric wires *p* and *p1*, which project to the surface of the projections *o* and *o1* of the bridge K, substantially as described and for the purpose specified.

3. The combination and arrangement of the electric wires with the batteries, the galvanometers S and S1, the sliding bar or circuit-changer L, and the bridge K, so as to produce a double-acting circuit by means of the motions of the pendulum, substantially as described.

4. The combination of the ratchet-wheel E with the pendulum H, by means of the lever F, forked bar G, and pawl I, arranged and operating in relation to each other, substantially as described, and for the purpose specified.

5. The combination of the ratchet-wheel shaft *c* with the shaft *a*, by means of the wheels C and D and pinions *e* and *e1*, substantially as represented.

Journal of the Telegraph.

This Journal will be issued on the 1st and 15th of each month, commencing with December 1, 1867. It commences with an issue of 4,000. The Western Union Telegraph Company have ordered 3,000 copies for its officers and offices. All its 5,000 stockholders will require it for information of interest to them. So of other telegraph companies and their stockholders.

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NEW YORK, JANUARY 1, 1868.

1868.



To the four thousand hands which will, in due time, receive our New Year's greeting, we extend our own, gladly and heartily hoping that to us all the year 1868 may be a happy and a hopeful one. The Telegraph may defy time and outride the sun; those, however, who perform its work must tread in the slower march of the year's progress, must meet its storms and sunshine, must count its laborious hours, and with fraternal strength and encouragement, with grace and grateful courtesies, exchange with each other the words of brotherhood and cheer as these annual cycles close.

How benignantly this easy chair looks out along the multitude of wires which radiate above the window which enlightens our table, to the many hands in distant places it seeks to grasp we cannot well find words to describe. It may, indeed, puzzle some how any face can be benignant which domiciles itself within the walls of rooms so executive, and from whence no voice is expected save as it comes in some new order respecting the despatch of business. And could the faces of the wearied men who perform the executive duties of these vast lines, to whom seem to come raining down from all the earth problems of labor and new programmes of duty, be seen sometimes as they pass our reposeful corner, little else would be expected. Yet on this bright morning of the young year these forges still hot with labor seem to have become radiant with a far-reaching benediction, and the mutual salutations which are exchanging between the workers, to be only the type of that which they offer to all who with them labor along the aerial courses by which the humming wires unite them with you all in their grand work.

All this may seem like fancy, the emanation of an easy soul's garrulity in an hour jolly with the elevation of New Year's Day. Yet to us, sitting with a very benignant yet very solemn brow over these salutatory lines, we attach to all such indications much meaning and much of hope. The wire that sings its strange monody through the air, touching the giver and receiver in exact measures of time, as by a common throb, and with all but personal intercourse, should be a type of a co-operative work so genial—so earnest—so fraternal—as to make all feel that the work is one. Not lowering authority nor weakening obedience; not slackening a needed rein, nor encouraging a restive thought, but making authority stronger because of a better

recognition of its rights, and giving dignity to subordination because of the brotherly elements which elevates and perfects obedience.

It is a lesson the world learns slowly that power to be triumphant must be kind. Equally forgetful are the fretting workers that the path to honor and power is by patience and fidelity. But the learners are multiplying and the lesson is in progress. This brightens the rim of the opening year. Let us work together; the President at his heaped up desk and the messenger on his nimble feet; the operator at his brightened key and the repairer on his sharpened gaffs. Meanwhile the Easy Chair will look out along the wires as he does to-day, with a cheery hail to all, and grow fat on the growing strength and gladness, the interpenetrating usefulness of the grand enterprise in which he holds an humble but devoted part.

The Atlantic Cable.

In our last number we stated the average daily receipts at the opening of the Atlantic cable to public use to have been \$6,101.76. This was an error. That sum was the aggregate receipts of the first six days at New York. We regret the error, although it did not affect the design of the article. We also stated the increase of persons using the cable as 300 instead of 200 per cent. We meant that three times as many persons now used the cable as during the months succeeding its opening. We are glad to record the fact again. New testimony as to its efficiency cumulates. The quick exchange of international civilities between the Duke of Wellington at the Royal Polytechnic banquet in London, December 21st, and President Johnson, elsewhere recorded, show how rapid is its work. With every added facility will come an enlarged employment of it by the public. It, also, enters on a hopeful New Year. *Virtutis fortuna* comes.

Telegraphers' Life Insurance.

It is known to a good many that an organization was formed a few weeks ago for the purpose of mutual insurance among operators. The plan is exceedingly simple, requiring a deposit of a small sum from each member to be given to the first who dies. Its officers have no salaries, it has no rents to pay, it has no outlay but for printing and postages. These expenses are provided for in the first call of \$1.50 from each member, the 50 cents being for expenses, the dollar for the Insurance Fund, with the probability that for many future calls nothing will be necessary beyond the payment of one dollar each to provide for the next decease.

Quite a number have joined this organization, but it needs a good many more to make it effective. There should be at least five hundred to one thousand members. One thousand or even five hundred dollars would bridge over a dreary chasm made by some man's departure. It would meet all the expenses of the sick bed and the grave, leaving a residue in the widow's purse enough to give time to look into the future and prepare for it.

Does not the opening year suggest the duty of joining this organization? It has no object in view but what it expresses. There are no salaried officials to exhaust its treasury. It appeals to no sense but that of a common necessity and the exercise of a common prudence. If it is to be a success it must become so by the efforts of those who have already connected themselves with it, or who may now join. We can only urge it as one of the simplest provisions against a common event—always dark enough without the misery which leaves the living not only without a provider, but penniless and alone.

Why is a poor operator like a stockbroker?
Because he "Bulls up" and "Bears down." Y.

1867.

The year to which we, to-day, bid adieu, has been one which will be remarkable for its labor, and the rapid culmination of those elements which must soon define the value of telegraphic property in America. Before its advent, the rapid accumulation of fortunes by a few pioneers, the result of whose pluck and sagacity made the name of the Western Union Telegraph Company a synonym for an almost magical success, had unduly stimulated the public mind. It had lowered a great public enterprise to the mere realm of speculation. Every movement of its Board was watched with cat-like curiosity, and the luminosity of a Director's eye as he issued from the sacred enclosure of the Board room was enough to set the telegraph market on the dance. The parlor furniture of a newly married couple were actually mortgaged to buy stock because of the magic of the words, "*Sibley went to New York last night!*" Residents in Rochester remember the meaning of such a remark as it was whispered beneath a keen unwinking eye that was full of rainbows. All this was unhealthy, but happily transient.

The union of the great companies under one management, with an immense aggregated capital, brought with it grave responsibilities. A property reaching from Newfoundland to Vancouver's Island, had to be harnessed into the most thorough discipline. Great wastes had to be stopped. Bad men had to be sifted out. A loose free system had to be thoroughly remodelled. The tariff had to be rearranged. The line and batteries had to be placed under new and keener scrutiny. Vast reaches of new line also—to meet the Atlantic cable on one side, and the Pacific railroads on the other, as well as the reconstruction of the devastated Southern lines—added to executive labor and caused large outlays of money. Thus 1867 has been emphatically a year of toil—toil nevertheless attended with marked and hopeful results. In no former year have American telegraph lines worked so successfully as at the close of the departed year, and at no former time have the reins of management been more thoroughly in hand.

Not the least among the aids to a healthy future is the decision by the Western Union Telegraph Company to pay matured debts rather than create new and increased obligations, or stimulate expectation by a dividend on a false financial basis. Already this has produced a sanitary result. It has the ring of right in it. It is so recognized. The want of the usual January dividend is felt keenly, but with hope.

So 1867, with its toils and anxieties, passes away. We trust that past work may prove to have been so wisely done as to secure for the future less of toil and more of practical success.

Our Reception.

Here is one of the first of our welcomes.

"JOURNAL OF THE TELEGRAPH."—The first number of a very neatly printed semi-monthly paper, with this title, has just been issued. It is especially designed as a convenient medium of communication between the telegraph fraternity, now numbered by thousands. JAMES D. REID is its editor; and no man living is more competent for the task. He has been identified with the telegraph system of this country from its infancy, as operator, constructor and manager, and always did every thing well. He is, withal, an industrious student; a fine writer, and one of the most estimable gentlemen of our acquaintance. As usefulness is the great object of his life, the TELEGRAPH will be a safe counsellor.—*Albany Evening Journal*.

Ah! George Dawson, your hand is always warm. It is not the first time it has come to cheer us with its New Year's benediction. No wonder you are a successful fisher. Were we a fish we would at once accept the hook, only too happy to lay ourselves in your ample basket.

Subscribers to *The Telegraphic Journal* will receive the JOURNAL OF THE TELEGRAPH until their time of subscription expires.

MONTHLY CIRCULAR.

EXECUTIVE OFFICE,
WESTERN UNION TELEGRAPH COMPANY,
145 Broadway, New York.
January 2d, 1868.

TO ALL OFFICES ON W. U. LINES:

The following changes were made during the month of December:

EASTERN DIVISION.

NEW OFFICES OPENED ON W. U. LINES.

Afton, N. Y., tariff add 40 and 3 to Albany through rate.
Biddford, Me., tariff same as Saco, Me.
Craton, N. Y., tariff same as Sing Sing, N. Y.
Dexter, N. Y., tariff same as Cape Vincent, N. Y.
Gray's Ferry, Pa., tariff same as Philadelphia, Pa.
Harpersville, N. Y., tariff add 40 and 3 to Albany through rate.

Check direct.

Smithfield, Pa., (Erie Dist.) tariff 35 and 2 from Alton, Pa.

OFFICES OPENED ON "OTHER LINES."

Delaware, N. J., tariff 35 and 3 from Scranton, Pa.

OFFICES CLOSED.

Mattapoisett, Mass., Athens, N. Y. (for the season), Charlotte, N. Y. (for the season), Port Morris, N. Y., Delaware, N. J., Mineral Wells, W. Va., Atison, N. J., business therefor be mailed from Waterford, N. J.; Shamong, N. J., business therefor by train from Manchester, N. J.; Bloomfield, N. J., business therefor be mailed from Newark, N. J.; Hackensack, N. J., business therefor be mailed from New York City.

After January 1, 1868, the Pennsylvania Central Railroad offices will be treated as "other lines," and business for such offices will leave this line at, and be checked against Philadelphia, Harrisburg or Pittsburg.

The rate from offices on this line to Philadelphia, Harrisburg or Pittsburg, will be checked "For This Line;" and the rate from Philadelphia, Harrisburg or Pittsburg to the offices of the Pennsylvania Central Railroad, will be checked "For Other Lines," the check being made and business forwarded by the most direct route. The offices of the Pennsylvania Central Railroad, and the rates from Philadelphia, Harrisburg and Pittsburg are as follows:

Philadelp.	Harrisburg.	Pittsburg.	Philadelp.	Harrisburg.	Pittsburg.
burg.	burg.	burg.	burg.	burg.	burg.
Overbrook, 30	40	60	Huntingdon, 45	40	45
White Hall, 30	40	60	Spruce Creek, 45	40	45
Eagle, 30	40	60	Tyrone, 45	40	45
Pauli, 30	40	60	Altoona, 60	40	40
Westchester			Holidays		
Inter, 30	40	60	burg, 60	40	40
Downingtown, 30	40	60	Gallitzin, 60	40	40
Cottsville, 30	40	60	Cresson, 60	40	40
Parkesburg, 40	40	60	Wilkes, 60	40	40
Gap, 40	40	60	Conowingo, 60	40	40
Leaman P'tce, 40	40	60	Johnstown, 60	40	40
Landesville, 40	40	60	Florence, 60	40	40
Mount Joy, 40	40	60	Blairsville, 60	40	40
Elizabethville, 40	40	60	Inter, 60	40	40
Marietta, 40	40	60	Blairsville, 60	40	40
Bainbridge, 40	40	60	Derry, 60	40	40
Rockville, 45	40	45	Lattrobe, 60	40	40
Marysville, 45	40	45	Greensburg, 60	40	40
Duncannon, 45	40	45	Penn, 60	40	40
Newport, 45	40	45	Irvine's, 60	40	40
Thompson's, 45	40	45	Brinton's, 60	40	40
Mifflin, 45	40	45	Saltsburg, 60	40	40
Lewisstown, 45	40	45	Apollo, 60	40	40
McVeytown, 45	40	45	Alleghy Jun., 60	40	40
Newton Ham-			Freeport, 60	40	40
ton, 45	40	45	Natrona, 60	40	40
Mt Union, 45	40	45	Springdale, 60	40	40
Bridgeport, 45	40	45	Sharpsburg, 60	40	40

When rate is 30, 40 and 45, each additional word 3 cents. When rate is 60, each additional word 4 cents.

Below is given the rate from New York and Philadelphia to the offices on the *Raritan & Delaware Bay Railroad*, to take effect January 1, 1868. Offices beyond New York and Philadelphia will obtain their rate to these offices by adding their present New York or Philadelphia rate (taking the lowest) to the rate here given, and check direct.

Philadelp.	New York.	Philadelp.	New York.
burg.	burg.	burg.	burg.
Manchester, N. J., 50	60	Shark River, 65	50
Toms River, " 55	65	Long Branch, 75	50
Brickburg, " 55	65	Easton June, 70	50
Squamum, " 50	60	Red Bank, 75	50
Farmingdale, " 60	60	Port Monmouth, 75	50

When rate is 50, and 55, additional word 4 cents. When rate is 60 and 65, additional word 5 cents. When rate is 70 and 75 additional word 6 cents.

IN CENTRAL DIVISION.

NEW OFFICES OPENED ON W. U. LINES.

Panama, N. Y., (Chautauque Co.) tariff same as Dunkirk, N. Y.
Lakeview, N. Y., tariff same as North Evans, N. Y.
Frederickstown, O., tariff same as Mount Vernon, O.
Genoa, O., tariff same as Elmore, O.

OFFICES RE-OPENED ON W. U. LINES.

Aladdin, Pa., tariff same as Freeport, Pa.

OFFICES OPENED ON "OTHER LINES."

Ashland Station, Ill., tariff from St. Louis 65 and 3, and tariff from Chicago, 85 and 4; Elvaston, Ill., (Hancock Co.) tariff from St. Louis, 70 and 4, and tariff from Chicago, 90 and 5; Woodburn, Iowa, tariff from Chicago, 110 and 6.

OFFICES CLOSED.—North Evans, N. Y.; North Bend, O.; Alkali, Neb.

Messages for Cutlettsburg, Ky., require 20 cents for ferriage in addition to South Point, O., rate.

SOUTHERN DIVISION.

NEW OFFICES OPENED ON W. U. LINES.

At Columbus, Texas, tariff according to printed scale.
At Smeedsville, Tenn., tariff same as Gillespie, Tenn.
At Trezevant, Tenn., tariff same as Paris, Tenn.
At Waverly, Tenn., tariff same as Johnsonville, Tenn.

The following named offices heretofore checked against Richmond, Va., will, on and after January 1, 1868, be checked direct; and the tariff between the following offices and offices in the Eastern and Central Divisions will be obtained in the usual way, viz: by adding the rate north to the rate south of Louisville or Washington. Offices in the Southern Division will add 75 and 5 to their Richmond, Va., rate, and check direct until a special tariff can be sent them.

	Tariff from Washington, D. C.	Tariff from Louisville, Ky.
Amelia C. H. Va.,	\$ 75	\$2 50
Barksdale, Va.,	1 00	2 50
Boston, Va.,	1 00	2 50
Brown's Summit, N. C.,	1 00	2 50
Chula, Va.,	75	2 50
Coalfield, Va.,	75	2 50
Clover, Va.,	1 00	2 50
Danville, Va.,	1 00	2 50
Drake's Rancho, Va.,	1 00	2 50
Jetersville, Va.,	75	2 50
Keysville, Va.,	1 00	2 50
Meherren, Va.,	1 00	2 50
News Ferry, Va.,	1 00	2 50
Pelham, N. C.,	1 00	2 50
Powhatan, Va.,	75	2 50
Reidsville, N. C.,	1 00	2 50
Ringgold, Va.,	1 00	2 50
Roanoke, Va.,	1 00	2 50
Ruffin, N. C.,	1 00	2 50

OFFICES OPENED ON "OTHER LINES."

Fernandina, Fla., tariff from Lake City, Fla., \$1.50 for ten words, 15 cents each additional word.
St. Augustine, Fla., tariff from Lake City, Fla., \$1.50 for ten words, 10 cents for each additional word.

OFFICES CLOSED.

Gillespie, Tenn., Tangipahoa, La.
In the list of offices to be checked against Enfield, Ala., as given in Executive Notice of December 2, 1867, read Columbia, Ala., instead of Columbus, Ala. Offices will make correction.

WILLIAM ORTON.

President.

Exhibit of the W. U. Telegraph Company.

This document we hoped to have issued with our present number. It is not quite ready on account of a desire to bring the statement up to the latest possible date, which will probably be December 1st. It will appear in our next number, of which a large edition will be published, and copies sent to every stockholder. Parties desiring current information concerning their telegraph interests should at once send in their subscriptions. The cost is trifling—one dollar per annum.

From almost every State we have already received subscriptions and encouraging words for the JOURNAL OF THE TELEGRAPH.

DECEMBER, 18, 1867.

James D. Reid, Esq., Editor Journal of the Telegraph:

DEAR SIR—I received the copy of No. 1 of the JOURNAL sent me a few days since, and feel it my duty to congratulate the profession upon its good fortune in finding so able and worthy a standard bearer to carry our banner high above petty jealousies and personal animosities.

Your manifesto has the ring of the right metal. Its kind words and mainly resolutions gladden the hearts of all who are conscientiously interested in the welfare and success of Telegraphy and its multitude of dependants. May your lamp of life never glimmer, but shine long to illuminate the hallowed walls wherein sits that stately easy chair in all its grandeur of simplicity, to quicken the life of that monster the "Great Monopoly," whose iron sinews radiate therefrom to every nook of the new world, and extending the hand of fellowship and progress to our brothers of the old world.

The JOURNAL meets with a hearty and substantial welcome here, and I trust we may be made twice glad every month by its prompt delivery.

Enclosed I send you \$20 for twenty-five copies commencing with No. 1.

Very truly yours,

LET EVERY MANAGER DO LIKEWISE, omitting, perhaps, the utterance of the warm words of congratulation so enthusiastically spoken, and which though we publish, we are not sure we now deserve.

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MARRIED.

In Jersey City, December 11, by the Rev. Dr. Mattison, Mr. Frank C. Ward, of the Western Union Company's New York office, to Miss Julia S. Kissam.

In Rome, N. Y., December 25, by the Rev. J. M. Harris, Albert W. Orton, of New York, and Miss Lizzie A. Van Patten of the former place.

At Ottawa, Ill., Dec. 11, by Rev. Dr. M. K. Whittlesey, Norman B. Williams, Esq., of Chicago, and Miss Carrie Caton, eldest daughter of Judge J. D. Caton, of Ottawa.

A Curious Clock.

Many years ago there was a clock made by one Droz, a mechanic of Geneva, which was renowned for its ingenious construction. The clock was so made as to be capable of performing the following movements: There were exhibited on it a negro, a shepherd and a dog. When the clock struck, the shepherd played six tunes on his flute, and the dog approached and fawned upon him. The clock was exhibited to the King of Spain, who was greatly delighted with it.

"The gentleness of my dog," said Dorz, "is his least merit. If your majesty touch one of the apples which you see in the shepherd's basket, you will admire the fidelity of the animal."

The king touched an apple and the dog flew at his hand, and barked so loud that the king's dog, which was in the same room during the exhibition, began to bark also; at which the superstitious courtiers, not doubting that it was an affair of witchcraft, hastily left the room, crossing themselves as they went out. Having desired the minister of marine, who was the only one who dared to stay behind, to ask the negro what o'clock it was, the minister asked, but received no reply. Droz then observed that the negro had not yet learned Spanish; upon which the minister repeated the question in French, and the black immediately answered him. At this new prodigy, the firmness of the minister forsook him, and he retreated precipitately, declaring that it must be the work of a supernatural being. It is probable that in the performance of these tricks Droz touched certain springs in the mechanism, although that is not mentioned in any of the accounts of his clock.

Want of Decision.

A great deal of labor is lost to the world for the want of a little courage. Every day sends to their graves a number of obscure men, who have only remained in obscurity because their timidity has prevented them from making a first effort, and who, if they only had been induced to begin, would in all probability, have gone great lengths in the career of fame. The fact is, that in doing anything in the world worth doing, we must not stand on the bank shivering, thinking of the cold and danger, but jump in and scramble through as well as we can. It will not do to be perpetually calculating risks and adjusting nice chances; it did all very well before the flood, when a man would consult his friend upon an intended publication for 150 years, and live to see its success for six or seven centuries afterward; but at present, man waits and doubts, and consults his brothers, and uncles and particular friends, until one day he finds he is sixty-five years of age, and that he has no more time to follow their advice. There is so little time for over-scrupulousness at present that the opportunity slips away. The very period of life at which a man chooses to venture, if ever, is so confined that it is no bad rule to preach up the necessity, in such instances, of a little violence done to the falling, and efforts made in defiance of strict and sober calculations.—*Sidney Smith.*

Honor Your Business.

It is a good sign when a man is proud of his work or calling. Yet nothing is more common than to hear a man finding fault constantly with their particular business, and deeming themselves unfortunate because fastened to it by the necessity of gaining a livelihood. In this spirit men fret and laboriously destroy all their comfort in the work; or they change their business, and go on miserably, shifting from one thing to another, till the grave or the poor-house gives them a fast grip. But, while occasionally a man fails in life because he is not in the place fitted for his peculiar talent, it happens ten times oftener that failure results from neglect and even contempt

of an honest business. A man should put his heart into everything that he does. There is not a profession that has not its peculiar cares and vexations. No man will escape annoyance by changing business. No mechanical business is altogether agreeable. Commerce in its endless varieties, is affected, like all other human pursuits, with trials, unwelcome duties, and spirit-tiring necessities. It is the very wantonness of folly for a man to search out the frets and burdens of his calling and give his mind every day to a consideration of them. They belong to human life. They are inevitable. Brooding, then, only gives them strength. On the other hand, a man has power given to him to shed beauty and pleasure upon the humblest toil, if he is wise. Let a man adopt his business, and identify it with his life, and cover it with pleasant associations, for God has given us imagination, not alone to make some poets, but to enable all men to beautify homely things. Heart-venish will cover up innumerable evils and defects. Look at the good things. Accept your lot as a man does a piece of rugged ground, and begin to get out the rocks and roots, to get out the soil, to enrich and plant it. There is something in the most forbidding avocation around which a man may twine pleasant fancies, out of which he may develop an honest pride.

Perhaps the best pun of this generation of lawyers was made by Lord Colonsay. A shoemaker of Aberdeen, in Scotland, had come into a fortune, after having fallen into several misfortunes, chiefly from feminine causes. He sought to divorce his wife, and she sought to divorce him, and in the various suits £2,000 or £3,000 was spent. Lord Deas, during a dispute about the wife's expenses, asked, "How would this shoemaker have got justice if he had been obliged to stick to his last?" The Lord President instantly answered, "He would have required to have spent his awl."

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GROUP PHOTOGRAPHS.

I have received for sale a few copies of a Group Photograph, size 18x21 inches, of English and American Telegraphic Engineers, Electricians, &c., from London. Among the group are MORSE, BONNELL, FIELD, BRIGHT, COOKE, WHEATSTONE, CLARK, SAWARD, HENLEY, WHITEHOUSE, and others—29 portraits in all—giving the names, profession, and residence of each person. Price \$5 per copy. Address all orders, with money enclosed, to

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Why Leaves Fall.

The most satisfactory explanation of the process by which leaves dry up and fall to the ground, without the intervention of the "killing frost," seems to be that of Dr. Inman, of Liverpool, whose theory is confirmed by several independent observers:

Dr. Inman has arrived at the conclusion that the fall of the leaf is due to the formation of a layer of cells, arranged in a plane different from that of the rest of the tissues, thus gradually severing the leaf from its support, much as a knife-blade would do; and, moreover, serving as a thin skin to protect the surface of what would otherwise be an open wound.

The cells of this dividing layer, as shown by Inman, and confirmed by Mohl, contain a quantity of starch, a substance not found in the adjacent cells. This dividing layer seems first to have been clearly observed by Link; Inman, Schacht and Mettenius confirmed its existence, and Mohl has added largely to our knowledge of it. We have yet to learn why this peculiar layer is formed. As to the period of its first appearance, that is known to precede the fall of the leaf by but a short interval, though indications of its future formation exist from a very early period. The first stage in the development of the leaf, as shown by Eichler, and recently confirmed by Dr. W. R. McNab, is constituted by the appearance on the side of the stem of a minute process called the "hypophyll," from which, and not directly from the stem itself, the leaf originates. Whether, when the leaf falls, the separation takes place immediately from the stem, or between this hypophyll and the leaf it supports, is not a matter of practical importance, and does not affect the explanation above given as to the cause of the defoliation.

Look to the Bedroom.

If two persons are to occupy a bedroom during the night, let them step into a pair of scales as they retire, and then again in the morning, and they will find the actual weight to be at least a pound less in the morning. Frequently there will be a loss of two or more pounds, and the average loss throughout the year will be more than one pound. That is, during the night there is a loss of a pound of matter which has gone off from the lungs and partly from the pores of the skin. The escaped material is carbonic acid and decayed animal matter, or poisonous exhalations. This is diffused through the air in part, and in part absorbed by the bed clothes. If a single ounce of cotton be burned in the room it will so completely saturate the air with smoke, that one can hardly breathe, though there can be but an ounce of foreign matter in the room.

If an ounce of cotton be burned every half hour during the night, the air will be kept continually saturated with smoke, unless there be a door or window for it to escape. Now, the sixteen ounces of smoke thus formed is far less poisonous than the sixteen ounces of the exhalations from the lungs and bodies of the two persons who have lost a pound of weight during the eight hours of sleeping, for while the smoke is mainly taken into the lungs, damp odors from the body are absorbed into the lungs and the pores of the whole body.

Need more be said to show the importance of having bedrooms well ventilated, and thoroughly airing the sheets, coverlets, and mattresses in the morning, before packing them up in the form of a neatly made bed.—*People's Journal of Health.*

A club of sporting gentlemen in Buffalo have established a telegraphic communication between the rooms in which their meetings are held and a popular restaurant some few doors above. A regular system of signals has been arranged—one stroke for a "whisky plain," two for a "brandy smash," &c., by which the orders of the gentlemen are at once conveyed to the bar, and answered without the "drunkies" leaving their room.

Telegraphers'**Mutual Life Insurance Association.**

INCORPORATED UNDER THE LAWS OF THE STATE OF NEW YORK.

I. This association shall be known as the Telegraphers' Mutual Life Insurance Association, and be organized under the general State law of the State of New York.

II. Its officers shall consist of a Treasurer and Secretary.

III. There shall be an Executive Committee of five, of which the Treasurer and Secretary shall be members, who shall exercise a general supervision over the affairs of the association and decide all questions which may arise.

IV. No officer shall, at present, receive any remuneration for his services.

V. No expense of any kind will be allowed except for expenses of incorporation, stationery, postages, circulars, certificates and advertising.

VI. Any person, regardless of sex or class, may become a member of this association provided they are or have been employed in the telegraph business and subscribe to these articles, and are unobjectionable to the Executive Committee.

VII. The initiation fee shall be one dollar and fifty cents, one dollar of which shall go to the contingent fund, and the balance to the expense account.

VIII. Upon the death of a member the Treasurer shall immediately, on application by the proper parties, pay over to them the fund which is on hand for that purpose, that is, the whole of the contingent fund on hand from the previous assessment.

IX. It shall be the duty of each member of this association to leave in writing, the name of his or her executor or heir, failing to do which the amount of insurance shall be used, first, to pay the expenses of burial, and the balance to be given to such relations of the first degree as are dependent on the deceased, or should there be none such, to be subject to the disposition of the Executive Committee for the benefit of the association.

X. Immediately on the decease of a member, the Treasurer shall assess each remaining member \$1, payable within thirty days of the issue of the assessment call, neglecting to pay which during the time specified, the delinquent shall forfeit all claims to membership or the benefits of the association, and he shall be restorable only on the unanimous vote of the Executive Committee and the payment of dues.

XI. A meeting for the election of officers shall be held annually during the first week in November in each year, who shall be elected to serve for one year or until their successors are elected. In case of the death of a member of the Executive Committee the remaining members shall have the power to fill the vacancy until the time of the annual election.

XII. Special meetings of the association may be called upon the written request of twenty-five members.

XIII. It shall be the duty of the Treasurer to receive all moneys, sign receipts, and pay bills and claims when audited by the Executive Committee. He shall give suitable bonds for an amount equal to twice the amount of money on hand at the time of his election.

XIV. The Secretary shall keep the records of the association, maintain such correspondence as is necessary with members, and issue such notices as may be necessary. He shall also aid the Treasurer in all matters in which he may require assistance.

XV. Certificates of membership shall be given, signed by the Treasurer and Secretary.

XVI. The books of the association shall always be open for examination by any member thereof.

D. R. DOWNER, Secretary.

W. O. LEWIS,

A. S. BROWN,

W. H. HILL,

Executive Committee.

J. D. REID, Treasurer.

DIRECTIONS TO APPLICANTS.

1. The number admissible as members of the Association at any one time, having been limited for the present to *fifteen hundred*, it is necessary to apply early if membership is desired.

2. Apply by letter, enclosing one dollar and a half and a three cent postage stamp for each application, to D. R. Downer, Secretary Telegraphers' Mutual Life Insurance Association, 145 Broadway, New York, and a certificate of membership will be sent by return mail.

3. Every applicant must be known to the Executive Committee, or to some responsible Manager of a Telegraph Office, and evidence of this, and of good character and of ability to work, must accompany each application. The endorsement of a reputable Manager will be regarded as denoting eligibility as stated, and the signature of the applicant, with date, amount and recommendation, will be all the form of application necessary.

4. Each applicant must file with the Secretary written directions respecting the disposition of the money to which he or she may be entitled at death.

5. No letters can be answered unless a stamp is enclosed for postage; and as the officers labor without compensation, correspondence requiring answers should be as limited as possible.

JOURNAL OF THE TELEGRAPH.

Published on the first and fifteenth of each month, commencing with December 2, 1867, will be what its name indicates, a record of Telegraphic progress throughout the world.

Although issued from the executive rooms of the Western Union Telegraph Company, and liberally patronized by that Company, the discussion of all subjects of interest to the Telegraphic world will be left free in the Editor's hands, and treated upon their merits as these may commend themselves to him.

By the aid of a liberal supply of periodicals having to do with electrical science, and coming from different parts of the world, a valuable gleanings of matter interesting to all owning or using, or working or managing Telegraph Lines will be provided. In this the Journal will be much aided by correspondence from experts both at home and abroad, who will keep it fully posted on electric subjects.

What it will advocate, or what oppose, it is not necessary to say. Warmly attached to the business as one of the most useful agencies known to the world, its care and purity, and adaptation to the wants of civilization will be the pre-eminent design. All communities should feel that in the Telegraph they have a common interest, and that national greatness, universal peace, world-wide sympathy and social happiness is largely dependent on its use and possession. This feeling will be fostered as vigorously as it is felt.

To those holding stock in Telegraph Companies the JOURNAL should have value. It will not be an advertisement for everything which any Company does or designs, but it will convey from time to time exact and truthful information respecting its business and condition, which must make it acceptable to all in any way connected with its interests. Even to those who do not hold stock, and for mere purposes of information, the JOURNAL, furnished at so trifling a cost, should be an acceptable and essential part of their means of general information.

To managers and operators, and all engaged in the service, we can only say that our interests are the same, and no man feels the ties of brotherhood stronger than the Editor of this new medium of intercourse between us. We shall use our liberty freely and frankly and kindly, and shall be happy only as being the means of good and blessing to others. It is no part of our nature to abuse or destroy. But it may be our duty to speak positively of evils thoughtlessly engendered, with a view to the ultimate good of all. We shall claim liberty to discuss all things freely, yet hope never to say that word which shall needlessly cause offence. Those only who demand a monopoly of opinion will find the opportunity for dissatisfaction.

Correspondence, brief, practical, sketchy, sensible, will be received gladly.

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Aside from the advantages apparent upon inspection of these magnets, their acknowledged merits consist in the construction of the helix, which was patented August 15, 1865. This being of naked copper wire, so wound that the convolutions are separated from each other by a regular and uniform space of the 1-600th to the 1-800th of an inch, the layers separated by thin paper. In helices of silk insulated wire the space occupied by the silk is the 1-150th to the 1-300th of an inch; therefore a spool made of a given length and size of naked wire will be smaller and will contain many more convolutions around the core than one of silk insulated wire, and will make a proportionably stronger magnet, while the resistance will be the same.

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145 Broadway, N. Y.**JOHN POLHEMUS, Printer, 102 Nassau Street, N. Y.**

JOURNAL OF THE TELEGRAPH.

NO. 4.

NEW YORK, JANUARY 15, 1868.

VOL. I.

Western Union Telegraph Co. Exhibit.

JANUARY 1, 1868.

To the Stockholders of the Western Union Telegraph Company.

At a meeting of the Board of Directors, December 11, 1867, the report of the Treasurer being under consideration, the following resolutions were unanimously adopted:

First—

"Resolved, That in the judgment of this Board it is inexpedient to declare the usual January dividend."

Second—

"Resolved, That the Executive Committee be requested to prepare a concise but full statement of the affairs of this Company, founded on the report of the Treasurer made to-day, for the past year or eighteen months, as they may see fit, and that the same be printed and distributed to the stockholders; and also a brief summary of the results shown by said report for publication in the newspapers."

In pursuance of the second resolution, the Executive Committee submit herewith the following report from the Treasurer:

TREASURER'S REPORT.

To the Executive Committee:

As no general report by the management has been made to the stockholders since October, 1865, it may be proper, in connection with the financial exhibit, to submit a brief statement of the present condition of the Company, which will be shown by the following tables:

No. 1.

CAPITAL STOCK.

At the date of the Report of October, 1865, the capital stock of the Company issued was,	\$21,865,100
It has since been increased as follows:	
October, 1865, by conversion of Bonds,	500
Nov. " by exchange for stock of California State Telegraph Company,	122,500
December, " by exchange for Lodi Telegraph Stock,	500
December, " by exchange for Trumansburg and Seneca Falls Telegraph Stock,	8,500
December, " by issue to Hicks & Wright for Repeater Patent,	1,500
December, " by exchange for Missouri and Western Telegraph Stock,	400
December, " by exchange for House Telegraph Stock,	1,400
April, 1866, by 2½ per cent. Stock Dividend, to equalize stock as per Consolidation Agreements,	479,300
June, " by issue for United States Pacific Lines,	3,333,300
April, " by consolidation with United States Telegraph Company,	3,845,800
July, " by consolidation with American Telegraph Company,	11,818,800
July, " by exchange for P., C. & L. Tele. Stock,	4,100
December 1, 1867, by fractions converted, to date,	49,100
Total present Capital,	\$41,008,800
Of the stock issued for United States Pacific Lines, there was returned to the Company, as consideration for completing construction of Pacific Line,	\$883,800
The Company owns also,	120,800
	\$1,004,100
Out of this we have issued for—	
Southern Express Co.'s Telegraph Lines,	\$150,000
California State Telegraph Co.'s Stock,	124,700
Other Telegraph Lines	80,000
	354,700
Now owned by the Company,	649,400
Balance, on which we are liable for dividends,	\$40,359,400

This is subject to be increased by further exchanges of outstanding American and United States Telegraph Companies' Stock, as provided for in the agreements of consolidation, viz.:
For American Stock, \$133,800
For United States Stock, 145,600

No. 2.

BONDED DEBT.

Bonds of the American Telegraph Company, due in 1873,	\$89,500
Bonds of the Western Union Telegraph Company, due in 1875,	4,867,300
Total Bonded Debt, December 1, 1867,	\$4,946,500

No. 3.

STATEMENT OF INCOME AND EXPENSES FOR 18 MONTHS FROM JULY 1, 1866, TO JANUARY 1, 1868.

(To bring this statement up to January 1, 1868, the business for December is estimated.)

1866.	Gross Receipts.	Working Expenses including Paid Other Lines, Rents, Taxes, Re-construction, &c.	Net Profits.
July,	\$562,293 97	\$410,382 40	\$151,910 57
August,	548,716 96	346,742 31	201,974 65
September,	556,955 95	296,931 99	259,023 96
October,	623,528 31	344,245 07	279,283 24
November,	571,036 02	332,508 66	238,527 36
December,	581,971 40	302,598 41	279,373 99
	\$3,414,501 61	\$2,025,406 84	\$1,389,094 77
1867.			
January,	\$580,560 53	\$341,104 71	\$239,455 82
February,	483,441 77	314,617 26	168,824 51
March,	530,643 66	297,076 59	233,566 07
April,	545,586 30	330,869 41	214,716 89
May,	535,437 94	326,529 83	208,908 11
June,	488,754 55	318,100 99	170,653 56
	\$3,154,423 75	\$1,918,598 79	\$1,235,824 96
1867.			
July,	\$536,156 89	\$380,917 53	\$155,239 36
August,	570,676 85	375,970 17	194,706 68
September,	601,548 79	375,641 50	225,907 29
October,	626,936 74	398,459 92	228,476 82
November,	583,723 66	370,429 57	213,294 09
December, estimated,	555,000 00	375,000 00	180,000 00
	\$3,475,942 93	\$2,351,418 69	\$1,224,524 24
Grand Totals,	\$10,044,968 39	\$6,195,424 32	\$3,849,443 97

No. 4.

STATEMENT SHOWING APPLICATION OF NET PROFITS.

Total Net Profits from July 1, 1866, to December 1, 1867, 17 months, as per table No. 3,	\$3,669,443 97
Miscellaneous Profits,	15,353 18
Total,	\$3,684,697 15
Applied as follows:	
Dividends.	
Dividend No. 23, July 1866 (balance),	\$ 8,897.34
Dividend No. 23, Jan. 1867,	795,634 00
Dividend No. 24, July 1867,	804,800 00
	\$1,610,431 34
Interest on Bonds.	
Six months to Nov. 1, 1866,	\$ 77,055 66
Six months to May 1, 1867,	186,761 32
Six months to Nov. 1, 1867,	174,730 50
	\$438,547 48
Appropriation to Sinking Fund for purchase of Bonds of 1875.	
Seven months to Dec. 1, 1867, @ \$20,000 per month,	\$140,000 00
Redeemed American Bonds,	53,175 00
Redeemed Bonds of 1867,	563,180 00
Invested in Construction of new Lines,	\$788,463 21

Less avails of Bonds sold,	302,460 00
	588,008 21
Purchase of sundry Telegraph Stocks,	125,644 27
Paid on account Buffalo Bond and Mortgage,	10,000 00
	\$3,537,581 30
Balance unappropriated,	187,115 86
Balance on hand July 1, 1866,	17,688 94
Balance unappropriated Profits December 1, 1867,	\$174,944 79

No. 5.

STATEMENT OF ASSETS AND LIABILITIES DECEMBER 1, 1867.

Assets.	
Telegraph Lines, Equipment, Franchise, etc.,	\$46,875,838 28
Western Union Telegraph Stock owned by Company,	649,423 50
Productive Stock in other Telegraph Companies,	49,870 00
Real Estate,	142,800 00
Due from Railroad and Telegraph Companies,	187,048 50
Due from Government and Press,	31,744 30
Due from Offices and Superintendents,	140,417 43
Bills Receivable,	62,141 55
Cash,	152,323 41
	48,291,605 86
Liabilities.	
Capital Stock,	\$41,008,800 00
Bonded Debt,	4,946,800 00
Bond and Mortgage, Buffalo Property,	15,000 00
Due on Dividend and Interest account,	75,818 56
Due Railroad and Telegraph Companies,	152,305 87
Due on Loan account,	134,821 58
Due for Internal Revenue,	16,983 98
Due Offices and Superintendents,	5,451 54
Total Liabilities,	\$46,865,881 53
Profits used for purchase of property,	1,747,330 78
Profits appropriated to Sinking Fund not yet expended,	18,498 76
Profits on hand unappropriated,	174,944 79
	1,935,774 33
	48,291,606 86

No. 6.

ESTIMATED AVAILABLE BALANCE, JANUARY 1, 1868.

Balance unappropriated profits, Dec. 1, 1867, see table No. 4	\$174,944 79
Estimated net profits for December,	180,000 00
Total,	\$354,944 79
Less.	
Estimated construction, December,	\$40,000
Appropriation to Sinking Fund, December,	30,000
Sundry assets unavailable,	30,000
	90,000 00
Estimated available surplus Jan. 1, 1868,	\$264,944 79

All of which is respectfully submitted.

O. H. PALMER,
Treasurer.

January 13, 1867.

The Committee hoped to be able to submit with this report a general statement, showing the condition and extent of the material property of the Company, but the want of the complete data at this time makes it necessary to defer such statement for a few weeks until such data can be obtained. It will be made in a subsequent number of the JOURNAL OF THE TELEGRAPH.

WILLIAM ORTON,
B. R. McALPINE,
O. H. PALMER,
Executive Committee.

Electrical Phenomena.

The attraction and repulsion of earthly bodies, to or from a given point, or the mechanical movement of the same, is spoken of under the head of earthquakes, or volcanic eruptions. The theories advanced in regard to the agencies which cause these disturbances are based upon the best of knowledge, and laws which are acknowledged to have had an existence since the world began. But may it not be that there are other and additional laws, besides these most popular with geologists, which have much to do with the phenomena of volcanic disturbance, if indeed not all to do with it in some instances. The power of the wonderful and mysterious agent known as electricity, which pervades all space, water and earthly bodies, is but partially known. Yet it is found to be a vital element in nature, creating life or destroying it just in proportion as it is come in contact with. Whether evolved from the action of acids upon the particles composing metals, as in the case of the voltaic battery, or by the friction of matter in the revolution of the earth, does not seem to be definitely known. That the portion of it with which the earth is charged is received at the poles, and by this pressure forming of the earth an oblate spheroid, is a fact, we are told by scientific scholars, which is established beyond hypothesis. And being then discharged at the equator, or belt of the earth by its ceaseless round of revolutions, it must pass through every body, seam and substance which compasses the entire mass. Understanding the character, or power of electricity, so far as it is understood, leads one to ask whether the phenomena of volcanoes, earthquakes, and the like, cannot be traced directly to this agency, instead of attributing these disturbances to the action and result of that internal heat which is said to ever exist and retain the earth's centre in a fiery mass of molten matter.

It is well known that electrical currents will traverse lines or bodies for which they have the most affinity. For instance, metals, water, moist substances decayed animal and vegetable matter—while they are repulsed by glass, resinous substances, silk, air, hair, &c.—and if, in the passage of these currents from the poles to the equator, they traverse a large field of conductive matter, and by sudden contact with repulsive or non-conductive material, are made to flow through a small space of matter for which they have affinity, heat would ensue, and if the matter so condensed was of a combustible character volcanic action at once takes place. Here we have one cause for eruptions which does not owe its origin to the original fire claimed to exist in the centre of the earth, and a cause fully as powerful as any other, with a constant supply of force to keep it burning where the character of the material is at all combustible.

Reference to the ordinary telegraph in use will illustrate the point plainly. A number nine wire, such as telegraphs are constructed with, will carry a current of electricity from a Grove battery of fifty cups, from two to three hundred miles, and work smoothly. If the distance be shortened it will work stronger, so that by adding battery and decreasing the distance a current of electricity can be evolved sufficiently strong to melt the wire, and if a strong current is used, and the wire should be broken and the two ends connected by means of a fine platinum, which is susceptible of great heat without melting, the electricity in passing over the platinum would be condensed to so small a body or surface as to evolve sufficient heat to contribute combustion to powder, or any light combustible substance which might come in contact with it. It is upon this principle that sub-marine batteries are exploded, and ignition contributed to objects which cannot be directly reached with a burning match or supplied with a percussion.

Here then, if we admit that there are combustible

substances throughout the centre of the earth—if we admit that the earth is charged with electricity, which traverses from one point to another in such manner and directions as its affinity directs—and if we admit that a sufficient body of electricity can be condensed upon an object to contribute combustion to it—we must also admit that we have sufficient cause for earthquakes, volcanoes and hot springs, without attributing it entirely to the effect of the molten mass which is said to exist in the centre of the earth.

The Electric Age—Another Ocean Cable.

The unprecedented success of the Atlantic cables, both as regards insulation and patronage, has surprised capitalists and opened up new fields for investment. The result is that capitalists are eagerly rushing into all submarine cable schemes that promise large dividends. Indeed, it may be said that this is the era of electricity, and it is not too much to predict that before twenty years have rolled by the whole civilized world will be united in a network of cables and land lines, by which the patrons of the Paris, Hong Kong, London, Madrid, Moscow, New York, San Francisco and other newspapers of the world can peruse the events recorded from all corners of the earth twenty-four hours after their occurrence.

We have now, besides the Cuba cable and many other small ones, two Atlantic cables in operation, a third one on the eve of construction from France to the Island of St. Peter's and thence to the United States, and at the present time a company is being organized in England to submerge a fourth cable across the Atlantic, of which Brest, France, and New York will be the termini. This company is called the "Franco-American Submarine Cable Company," and will organize with a capital stock of £900,000 sterling. One third of the stock and the Directors will be given to England. One-third to France and one-third to the United States. The books have been opened in England and its share of the stock subscribed. The French bankers, it is said, have guaranteed the subscription of another third. A contract has already been made with the India Rubber and Gutta Percha Telegraph Company of Silvertown, London, for the manufacture of three thousand seven hundred miles of cable which will support itself in water a distance of thirty miles. The contractors have taken the English subscription as an advanced payment, and will at once proceed with the manufacture of the cable, which will probably be laid next summer.

This new company have received valuable concessions already, including one from the French government, giving them for five years all transatlantic business coming this way that touches French wires, and one from the Submarine Telegraph Company across the English channel, who agree to give them all the messages that touch their wires *en route* to Brest.

But the great advantage claimed by this company for the public is expedition and cheapness in the transmission of despatches. Having a direct line of submarine cable, the time consumed in repeating messages between New York and Heart's Content will be saved, and it is understood that the tariff will be but one shilling sterling per word. It is expected that at this rate the company will secure sufficient business to occupy the cable twelve hours of the twenty-four. A good operator will send or receive fifteen hundred words per hour, yielding a revenue of nine hundred pounds per day, or two hundred and seventy thousand pounds per year. It is estimated that the expenses of running the line will be about seventy thousand pounds per year, leaving net profits two hundred thousand pounds, or twenty-two per cent. of the capital stock.—*Herald*.

Why is a cable operator like a coquette?

Both look in the mirror for reflection and pay great attention to the sparks.

Electricity and Vegetation.

M. Blondeau states that subjecting fruits—apples pears and peaches—to the action of an induced electric current—hastened their maturity. Having rendered seeds good conductors by moistening them, he affirms that electrifying them by induced currents causes them to germinate earlier than similar seeds not subjected to such action. He says "some haricot beans which were electrized exhibited a singular, peculiarity. They germinated *head downwards, and root upwards in the air!* That is to say, the gemmule, surrounded by its cotyledons remained in the ground, while the root, separated by a little stem from the gemmule, erected itself in the air. This fact appears important, as explaining the reason why plants push their roots into the earth and their stems into the air. This tendency is so strong that efforts to cause them to act otherwise are fruitless; but it may be overcome by the electric shock in the same way as the poles of a magnet may be reversed. We are tempted to liken the embryo to a small magnet with opposite poles."

International Courtesies.

LONDON, Dec. 24.—At a banquet given at the Royal Polytechnic on Saturday night last, in reply to the following sentiment from the Duke of Wellington, a felicitous telegram from the President of the United States was read, amidst great enthusiasm. Not a little of the interest attaching to these despatches grows out of their rapid transmission.

LONDON, Dec. 21.—The Duke of Wellington, the directors and the scientific guests now at the Royal Polytechnic, London, Eng., send their most respectful greeting to the President of the United States, their apology being that to the discoveries of science the intercourse between two great nations is indebted.

WASHINGTON, D. C., Dec. 21, 1867.—To the Duke of Wellington, London: I reciprocate the friendly salutation of the banquetting party at the Royal Polytechnic, and cordially agree with them in the sentiment that free and quick communication between governments and nations is an important agent in preserving peace and good understanding throughout the world and advancing all the interests of civilization.

ANDREW JOHNSON.

The reply occupied twenty-nine minutes in actual transmission. On the same evening a message of twenty-two words was started from the Polytechnic for Heart's Content, at exactly 9 P. M., and at ten minutes past 9 the reply, of twenty-four words, was delivered.

Simplification of the Galvanic Battery.

It has been found by M. Manuelli Giacomo, that sulphate of zinc may be substituted for the sulphate of copper in a Daniel's battery and without lessening its power. The effect of such a substitution is a considerable saving of expense, since the cost is merely that of zinc consumed. He found, also, that a very good galvanic current will be produced if zinc is substituted for the copper of the battery. In this case, zinc constitutes both the electro positive and electro negative metal.

The Atlantic Cable.

LONDON, January 11.—The directors of the Atlantic Telegraph Company have issued a prospectus to raise one million three hundred thousand pounds sterling, to purchase all the rights and interests of the Anglo-American Telegraph Company in the two cables across the Atlantic, between Ireland and Newfoundland, and to pay of their indebtedness.

A telegraphic dispatch from London, dated December 1, at two o'clock A. M., was received at St. Paul, Minn., at half-past ten o'clock on the night of November 30.

Correspondence.

Cable Alphabets.

FORT WAYNE, IND., Dec. 18, 1867.

J. D. REID—DEAR SIR—It is just possible you may remember, some many years ago, a Wheeling "Jones," and to whom you had the generosity to be kind. I have managed, perhaps, by better luck than merit, to retain position until the present moment.

I have spent the greater portion of my life in pursuit of the high speed automatic system of telegraphing automatically, repeating over any number of circuits and printing at the last.

The purpose of this paper is other, however, than that, and I can hardly explain how I hope that you possibly may be induced to aid me and further my endeavors in pursuance of my next project.

I understood very lately that the cable folks were using the dot and dash system, as also the rather long European telegraph alphabet. Some three years ago I invented a cable alphabet, but the matter went by with little attention, on the apparently fair presumption that with the combined genius of European scientific men, with their advantages of being conversant with so many facts not in my possession, they could not have avoided finding the best possible system of operation.

The mechanical expedients for practically operating my system are of late date.

In estimating the rate of respective systems I use the dotting time as a unit of measure. Assuming any certain number of dots a minute as the standard—even in length, with even intervals between each. Now, any system rated by this standard must make good the condition that no impulsion must succeed a previous one more rapidly or abruptly than would occur in said even run of dots.

By estimate I find the European alphabet to require a lapse of time equal to 3 62-100 dots per average character, allowing in spaces and periods.

By estimate I find the Jones cable alphabet to require a lapse of time equal to 1 93-100 dots per average character, allowing in spaces and periods.

Unlikely as this may appear I undertake to substantiate it about as stated:

The system requires for its success isochronous revolutions of a shaft at each end, two revolutions to each dot, with a coincidence of initial position at the same instant of time, something similar to the combination system.

The result is obtained in this: each shaft governed by a high speed; centrifugal friction governor, true to an error of not over $\frac{1}{4}$ per cent. error in speed; also the main shaft being forced to observe the determination of a chronometer balance of the best class, true to the fraction of a second per hour; a gain wheel device feeds in a very small fractional advance, when at any stroke of the balance the centrifugal wheel will be found at an error behind its proper position.

The circuit master may also apply a small correction in time when he determines by the average movement of the waves, it is needed.

The positiveness of the strokes, and the absolute precision of the measurements, together with a peculiar facility in the determinations concerning the waves by the observers, is apt to justify an advance in the rate of dots from that element alone.

Yours, very respectfully,

C. K. JONES.

Reply by C. P. Varley, Electrician.

DEAR SIR—Mr. J. D. Reid has shown me your note of the 8th, with which I am much pleased.

I see you have naturally, in the absence of a good account, supposed that the Atlantic cable is worked by dots and dashes. It is really worked only by dots, viz.: right hand and left hand movements.

I will explain briefly why such an instrument as

you propose could hardly be employed on the Atlantic line.

First, all cable people like to work with a very small battery power, so that should an escape show itself the cable may not be injured by strong currents passing in and out of the escape.

Secondly, the speed of transmission, with the apparatus employed, is not augmented by increase of power; that is to say, one cannot make distinct waves arrive at the distant end more quickly by means of 100 cups than with ten or one. The reason why ten cups of Daniells battery are used is because we avail ourselves only of $\frac{1}{10}$ part of the full power of the battery, and so the signals are really only of that strength which the one-tenth part of a cell would produce.

The current arrives at the distant end of the line gradually; an appreciable time elapses before the current attains strength enough to move the most sensitive galvanometer, and when it begins to arrive, it rapidly augments in strength, and gradually approaches to, but never actually attains its full or maximum strength. On land lines this period is too short to be noticed by ordinary apparatus, and the current seems to arrive at the distant end instantaneously, but it is not really so.

The accompanying sketch shows the rate at which the current augments in strength; also the rise and fall of the current when working a Morse instrument on a submarine line, by which you will see how much quicker my method of working is.

We get by our present mode 11 words a minute, and when the business requires more speed our curb key, &c., will augment the speed to 16 or 18 words a minute.

In the diagram you will see the rise and fall necessary to produce a dot and dash without the curbing apparatus.

The little wave shows the one actually in use, and but for a most sensitive instrument it would not be perceived.

Very truly yours,

CROMWELL F. VARLEY.

Telegraph Keys.

To the Editor of the Journal of the Telegraph—

Is it not a little singular, that in the midst of the very great improvements which have been made in the machinery of the Morse system during the past ten years, so slight attention should have been given to the important subject of keys? While relays and other receiving apparatus have bounded from semi-barbarism to something like mechanical perfection, so that the jury of the Exposition could say that the collection at Paris last summer was superb, the transmitting instrument of to-day is almost identical with those used in the times when telegraphing "tried men's souls."

Notwithstanding the continual growl of operators over imperfect manipulation; notwithstanding even the innumerable mistakes, due in larger measure to the imperfection of the instrument than the carelessness of the man; notwithstanding wretched connections with their added resistance—telegraph instrument makers and telegraph companies have apparently made up their minds that "anything will do for a key."

The faults of our present instruments are both of scientific design and mechanical construction: they are dangerously—sinfully imperfect. In my own slight personal experience I have known of more perplexing and difficult-to-locate troubles in keys, than in any other part of the line. I remember on two separate occasions, and in different offices, being nearly an hour in determining the existence of an escape in keys, of which I was all the time morally certain.

In the small space which you could spare me, it would not be possible to touch upon all the points

where improvement is demanded, and I shall refer to but two—

If one could be perfectly sure of no lateral motion, the present style of pivoting the lever, by trunions near its center, would not perhaps be so objectionable, but when the contrary is the case, when we are convinced that there is a very considerable side force, limited only by the temper of the operator, it appears to me, the folly of it is evident. Moreover the pivoting screws are adjustable, and hence each operator works them at a different tension—some of them so loosely that the electric force must be in a sad way to find a path for itself to come to time—and if it don't, always, is it very remarkable that the confusing "odd" dots will occur? The screws themselves have their threads cut, in a great many cases, with a perfectly bewildering want of accuracy. The trunions, too, being of iron, help the matter amazingly in a damp atmosphere, or when some of the careful operators seek to diminish the friction with oil!

The jumping of the lever in its pivots finds an admirable correlate in the graceful recoil of car wheels upon most of our railroads, and the effect is precisely the same in both cases. To the man who initiated the present system of circuit closers, immortal honor is due. Were it possible to make an alloy of brass and leather, a medal in this substance only would be fitting tribute to his transcendental genius. It appears to me there are few men who could have originated this tremendous absurdity, and solely on the grounds of its greatness can be reconciled the fact of its continuance. The simplicity which expects a helicoidal lever between two and three inches long, pivoted at its extremity, to move in a true horizontal plane, under the direction of all sorts of forces and at the same time always preserve sufficient elasticity to close the circuit, is something marvelous and grand.

What is especially needed is a self-circuit closing key, taking the discharge between platinum points, one which having the necessary mechanical simplicity and strength, will be no outrage on the over-worked galvanism, a thoroughly reliable, accurate, safe instrument.

It does not seem probable that the mechanical operators proposed by Wheatstone and others will ever be much, (if at all) used in this country, linked as it is with the customers own translation, and I submit that some thought should be expended on the improvement of our transmission apparatus in which we may look for security from "open" lines and "bulls."

Very respectfully,

PHILADELPHIA, Dec. 28, 1867.

T.

Weather Reports by Cable.

JANUARY 10.

We are able to add to-day to our weather reports, an item from Newfoundland and another from Ireland. The request for this information was sent from New York at precisely 10 A. M., and the replies were received and delivered in this city in fourteen minutes, as follows:

HEART'S CONTENT, Newfoundland, January 10—3 P. M., Greenwich time—Snowing.

VALENCIA, Ireland, January 10 3:02 P. M.—Wind south—Raining.

BELFAST, January 10.—The clerks in the office of the Magnetic Telegraph Company in this city have been arrested and thrown into jail, on the charge of belonging to the Fenian organization.

The Russian Government, it is reported, has granted a concession to parties in London and Berlin, for the construction and working, within the Russian territories, of a direct line of telegraph between London and Italy, a large portion of which will pass through Russian territory. The concession is granted for twenty-five years, dating from the commencement of the line's effective working.

Journal of the Telegraph.

This Journal will be issued on the 1st and 15th of each month, commencing with December 1, 1867. It commences with an issue of 4,000. The Western Union Telegraph Company have ordered 3,000 copies for its officers and offices. All its 5,000 stockholders will require it for information of interest to them. So of other telegraph companies and their stockholders.

TERMS:

One Dollar per annum in Advance.

FOUR DOLLARS FOR FIVE COPIES.

Address—

JAMES D. REID,
145 Broadway, New York.

NEW YORK, JANUARY 15, 1868.

Western Union Co. Exhibit.

On our first page will be found a carefully prepared exhibit of the affairs of the Western Union Telegraph Company during the past eighteen months. It is the first of the kind made for some time. Of this reticence many have been inclined to complain. With more or less urgency a publication of the operations of the Company has been requested, but has been quietly and persistently declined.

Nor were arguments wanting for the non-publication of its affairs. With all its success, the history of the Western Union Telegraph Company has been a struggle. It has had to do and dare that which a fastidious and timid outside sentiment would have embarrassed and perhaps prevented. The policy of uniting weak and minor lines in one, so as to connect the points of profit—the commercial centres—under a unique authority, at first contemplating only the combination of a few interests in Ohio, Michigan and Illinois, gradually asserted a wider application. With the opening knowledge of the capacities of the electric current to project itself to far distant points, the boundaries of separate telegraph companies became offensive. The spark which could be lit on the Pacific by a finger on the Atlantic, demanded freedom from the repetitions it might have been required to make at the gateway of each intervening State. To secure this required large sums of money, which a narrow and greedy policy would have divided in dividends, and which would have inaugurated a contemptible system on which no great future either for the Telegraph as an element of power and usefulness or the Company could have been reared. With the publication of all its plans and movements and expenditures would have come a hurricane of hungry, yelping invective, which it was wisdom to confine.

The time has now come when these exhibits can be made. This journal will be the medium of their publication, together with all such fragmentary items as may be deemed desirable for those who are interested in the progress of the Company to know. It seems unnecessary to say that every person holding a share of stock should secure this paper. The present number is sent free to them, but the current information hereafter provided must be obtained by subscribing for it. One dollar per annum, an amount sufficient to cover its cost, will secure the reception, twice a month, of not only the distinctive information alluded to, but a mass of interesting items, gathered from the choicest sources, of electrical phenomena, and the spread of telegraphs throughout the world.

Of the statement which we to-day present we have little to say. Yet there are a few salient features to which we call attention, and which may aid some unaccustomed to the array of figures the exhibit presents in understanding the points they are intended to illustrate.

I. The actual nett earnings during the eighteen months covered by the exhibit is shown to be \$3,849,443.97, equal to an annual dividend of six and a half per cent. per annum. This result is obtained after deducting all ordinary expenses and the cost of all the class of expenditures coming under the head of "reconstruction."

II. The deductions to be made from this income may be classified as follows:

1. To be used annually in cancelling bonds.	\$240,000
2. Interest on bonds, of which the amount is being reduced by their extinction.	340,000
3. Cost of construction—estimated.	400,000
Total.	\$980,000
Net annual earnings—say	2,869,443.97
Leaving for dividends, or about four per cent. per annum.	\$1,620,000

III. The amount paid for new property during the past eighteen months was \$1,500,000—leaving, January 1, 1868, after paying a two per cent dividend in July, a credit balance of \$264,944.79, as shown in the Treasurer's statement.

IV. The obligations of the Company are \$4,946,800, \$89,000 of which matures in 1873, and \$4,857,300 in 1875, one half of which will be paid by the monthly absorption now going on.

The exhibit must impress all who study it with the magnitude of the trust reposed in the hands of the officers of the Company, and the necessity of the most unremitting energy in the management of its affairs. Is ought to moderate expectation, to prevent discouragement, to discourage speculation, and unite all in securing that success which can only result from united counsels and persistent toil.

Presentations.

We record, with great pleasure, the account on the succeeding page of the presentation of a valuable gift to Superintendent R. C. Clowry, of St. Louis. These are the things which unite and strengthen men in their work. To no man in telegraphic harness could such a gift be more worthily given. Prompt, clear-headed, executive, faithful, persevering, Mr. Clowry is a most valuable aid in the management of Western Telegraphs. He enjoys the fullest confidence of his Company, and we are exceedingly pleased to see the evidence of the esteem in which he and his estimable lady are held at home. Long may they live to enjoy it.

Mr. C. S. Jones, operating manager at Albany has also come in for his share of good things. On New Year's day he was presented by his operators with two handsome volumes "Shakespeare," and "Loves and Heroines of the Poets." We congratulate our old friend on this token of appreciation, knowing the personal worth both of the donors and donee.

Major W. H. Heiss.

The International Ocean Telegraph Company have given the general superintendence of their line to Major W. H. Heiss. They could not have given it into better hands. He left on Saturday last by the Bienville for Havana. He goes there to lay five miles of subterranean cable, between Havana and Cherora. His headquarters will be in Florida. The whole enterprise is a success, and there can be no doubt but that the lines thus reaching Cuba will be gradually extended until they connect the South American Republics, where, as will be seen, new lines are in process of construction.

Sal Ammoniac.

Some eighteen years ago there came to Pittsburg from Rochester, N. Y., Mr. Gustavus Swan, now of the Astor House telegraph office, with a patent for the use of Sal Ammoniac in the composition of main batteries. He represented a company of which Hiram Sibley, Esq., was President. The use of Sal Ammoniac was to dispense with the necessity of mercury upon the zinc cups, by which undue action was prevented and yet the power of the battery maintained. So much, however, were the companies occupied in other matters that little attention was paid to Mr. Swan's mission, and, we believe, the subject was dropped.

In the last issues of the European scientific magazines we observe reference made to this use of Sal Ammoniac as a new discovery. Here is one of the items:

"Certain improvements have been suggested by M. Zaliwski Mikariki. His latest experiments show that by increasing the height of the elements, without altering their base, a current proportionate may be obtained. He recommends the following method for increasing the energy and permanency of a Bunsen's battery: Place the porous vessels one within the other. Into the first, containing the carbon or platinum, pour nitric acid. Into the second pour sulphuric acid. Into the outer vessel, containing the zinc, pour sal-ammoniac. There is no effervescence, and the zinc undergoes no useless destruction. Gelatine in battery renders copper soft, malleable—nearly equal to rolled copper."

The use of mercury in amalgamating the zinc cells of batteries reaches about 200 flasks per annum at a cost of about ten thousand dollars. If a little sal ammoniac mingled with the diluted sulphuric acid renders the use of mercury unnecessary, we do not see why it should not be employed and this expense saved to the companies who now use it. It would also much reduce the labor of battery work, and remove from battery rooms an article in the use of which there is usually much waste.

Postal Telegraph.

We see from the Washington Correspondent of the *Tribune* that Mr. Washburne is again at work on a bill to place the Telegraph in the hands of the Government. We have already, with some emphasis, expressed our conviction on this subject, and have found no cause to change the sentiments so expressed. Once take from popular management the pursuits which give vigor to our national life, and place them in the hands of Government officials, then farewell to the enterprise which stimulates and distinguishes us as a people.

The New York Telegraphers' Ball.

We find upon our table this morning a most exquisitely printed invitation to attend the annual ball of the "New York Telegraphers," January 24th, under the management of Mr. John Horne, Jr., chairman, at the New York Assembly Rooms. A very select company are expected, and General Burnside is looked for as one of the happy participants. We must plead great ignorance of such matters. We can't dance, although we have jumped for joy once or twice. But we hope all may be happy, and not stay out too late.

To Correspondents.

We have in type a description of styles of key exhibited at the Paris Exposition which we desired to publish in this number to show our good correspondent T. that the subject of which he writes is not wholly ignored. We shall give these descriptions in our next. A communication from Chicago is necessarily postponed, as are several others, all of which will have attention in due time.

George Peabody's Gift to Cyrus W. Field.

Starr & Marcus, John Street, New York, have now ready for examination this magnificent gift. It consists of 12 pieces of solid silver, inlaid with gold, elegantly and elaborately chased, and on each piece medallions of Mr. Peabody and Mr. Field. On each article also is inscribed the following:

GEORGE PEABODY

TO

CYRUS W. FIELD,

In testimony and commemoration of an act of very high commercial integrity and honor.

New York, November 24, 1866.

The pieces are as follows:

1. Tureen, massive and of beautiful design.
 2. Epergne. Supporting the fruit or flower basin, is a solid silver figure, representing the genius of the New World standing on a globe, on which are engraved the signs of the Zodiac. On either side of the basin are Cupids—one sharpening an arrow, the other bearing a flambeau.
 3. Ice bowl, supported by sphinxes.
 - 4, 5, 6. Cake and fruit dishes.
 - 7, 8, 9, 10. Vegetable dishes, so made as to be convertible into eight pieces.
 11. Decanter, very elegant.
 12. Coffee kettle, massive and of beautiful design.
- All of these pieces bear the Field arms—a hand holding the globe, and bearing the old family motto: SANS DIEU RIEN.

(From the St. Louis Daily Missouri Democrat.)

A Surprise Presentation.

Colonel R. C. Clowry is well known as the efficient and popular superintendent of the ninth district of the Western Union Telegraph, and his urbanity and faithfulness are proverbial among all who have business relations with him. As the holidays have approached, the employees under him, telegraph operators and repairers, have been secretly at work arranging for the presentation of a gift worthy of their own attachment, and which should at the same time be a durable memento both to the worthy colonel and his wife also, who is a most accomplished pianist. Accordingly, they selected and purchased an elegant cabinet organ, in a rosewood case, a superior instrument of six stops, and last night was the time decided upon to present it. About eight o'clock the entire party of donors took carriages, to visit the colonel at his residence, near the corner of Dayton Street and Garrison Avenue. They were accompanied by an express wagon, bearing the organ, and on reaching the vicinity the party alighted, and called on the gentleman, who was taken by complete surprise in seeing his operators, one after another, to the number of twenty or more, file into his parlors. A few moments of pleasant chat followed, when the door once more opened, and in came the expressman and his assistants, bearing the organ, completely enveloped in a proper cover. Mr. E. H. Brown, manager of the office, on behalf of his associates, at once stepped forward, withdrew the cover, and addressed the surprised colonel in the following

PRESENTATION SPEECH.

COLONEL: I have been requested by the gentlemen of the Western Union Telegraph office to make a speech pertinent to the occasion which has brought us here unannounced this evening.

As the old year is drawing to a close and we are soon to leave it behind and cross the threshold of the new, we have desired to add another reminiscence to the many pleasant ones of the year, and also to couple with it in a tangible and durable form an expression of our united esteem for you as our superintendent.

The ripple of daily news starting on its telegraphic journey in the sunny climes of Egypt, and speeding its way across the face of the old continent, plunging through the depths of the mighty deep and gathering with increased volume on its western shore, pursuing its journey over and around the

cragged hills and across the broad prairies and through the mighty rivers, to the western banks of the Father of Waters; it has been our duty to pass it westward to the western shore of the Pacific, and in return to receive the ebbing of the news tide as it receded back into the sea of busy life to its distant eastern shore. And again, as the indications of the throbbing of the pulse of the great commercial centers of this and other lands have passed to and fro, or as the citizens of this city have exchanged business, family and social communications, with their immediate and distant neighbors, it has been our duty to guide and control the element that enabled us to annihilate time and space for the public in the performance of our several parts in the great telegraphic system. I but feebly express the sentiments of the gentlemen when I say that we are proud that we have been directed in our duty by a leader so roughly and practically up with the times. The same prompt and faithful manner with which you have executed the orders of your superior officers you have demanded of us in our execution of yours. More than this was not required, less was not tolerated.

With a desire to contribute towards your recreation from the cares and perplexities of life, and also to contribute to the gifted and cultivated musical talent of your wife an additional instrument for her amusement and your entertainment, I present to yourself and lady, in behalf of the Western Union Telegraph office, this cabinet organ, with many a merry Christmas and happy New Year.

Colonel Clowry responded with brevity, but appropriately, as follows:

MR. BROWN AND GENTLEMEN: I have no words to reply suitably to this unexpected visit and this splendid present. All I can say is to thank you most heartily on behalf of myself and my wife. With regard to the feelings you have been so thoughtful as to express towards me, I must say, I do not know whether I deserve them or not. But I have always tried to secure the friendship and good will of those with whom I am in business relations, by trying to serve them as well as myself. I take your gift as a testimony of that good will, and, as I said before, I shall prize it all the more highly because it will be a source of pleasure and of happiness from its use to my wife as well as myself.

Mrs. Clowry was then very appropriately addressed, and the unanimous desire of the gentlemen present was tendered her that she might discourse to them some of the delicious music of which she is a gifted exponent, from the instrument presented. Mrs. Clowry replied by a gracious expression of willingness to gratify them, and the rich, full harmony of the organ was soon echoing through the rooms. A brilliant variation of "Sweet Home" on the piano followed, and an hour or two was spent in social festivities, after which the party returned to the city, happy in a pleasant evening and a good deed worthily accomplished. The organ bears, upon a silver plate, the following inscription: "Presented to Mr. and Mrs. R. C. Clowry, by the employees of the Western Union Telegraph Office, St. Louis, Christmas, 1867."

New York, Newfoundland and London Telegraph Company.

The New York, Newfoundland and London Telegraph Company have constructed, during 1867, an entire new line from Plaister Cove, Cape Breton, to Hearts Content, Newfoundland via Ashbee Bay. Another new line has been built by the same Company, connecting the same points via Sidney and St. Pierre. This gives connection with the Atlantic Cable by three perfectly new and reliable lines. One cable, 351 miles long, between Sidney and Placentia via St. Pierre forms part of one of these routes. Two cables, respectively 55 and 89 miles long, across the Gulf of St. Lawrence, form parts of the other routes.

Ahead of Time.

The New York *Tribune* is not infallible to mistakes. The following learned paragraph appears in a late number:

"A telegraphic dispatch the other day came from London to Washington in nine and a half minutes. Suppose it to have kept on around the world, the circuit would have been made within an hour. What said Shakespeare? 'I'll put a girdle around the earth in forty minutes.' If the dispatch referred to above had started from London at one minute past eleven on December 20, it would have gone around the globe and arrived at its starting point by fifty-eight minutes past eleven December 19—apparently making the girdle of the earth nearly twenty-four hours before it started. 'Canst thou send the lightnings, that they may go and say unto thee, Here we are?'"

—No more would the dispatch mentioned by the *Tribune* arrive at its starting point nearly one day before it left, or "nearly twenty-four hours before it started," than could a gentleman leave the battery at 1 o'clock, walk up Broadway and arrive at the City Hall twenty minutes before he left the battery. If this could be done one could retrace his steps and renew his youth. Telegrams, in crossing the ocean, or the continent, from east to west, gain on the time existing at the points they pass until they have reached the antipodes, when they return, with time gaining on them, to the point from whence they start, consuming just the amount of time necessary for their transmission. If they pass around the globe of course they will pass through the night somewhere existing, but they do not get into the next day or fall back into the past. If they leave London at 12 M. they will reach the antipodes at 12:30 on the morning of the same day—allowing one hour to make the entire journey around the earth—after which it is a race with time, in which the latter makes up all it has lost except the sixty minutes consumed in transmission. Like an envelope the sun covers the earth and darkness closes the seam of the envelope behind, the day becoming brighter as advance is made in both directions from this seam. The time indicated by the position of the world would first carry the telegram back to nearly the beginning of the day when it had reached the antipodes, after which it would return, requiring just the time necessary to transmit it to bring it back to London. But according to the *Tribune's* theory, a telegram might travel around the world by the hour, gaining three days in every twenty-four hours, until it had dated itself back to the flood, or the creation. This is something entirely "new under the sun," and its discoverer should consider himself the best miracle worker who has yet appeared on the stage.—*Eric Times*.

Copper amalgam, used in the reproduction of etched and engraved plates, is made by mixing mercury and pure powdered copper in a small quantity of nitrate of mercury. Lowe obtains powdered copper by adding to a saturated solution of sulphate of copper an equal quantity of hydro-chloric acid, and placing in the mixture thin strips of zinc, when hydrogen gas is evolved and a porous mass remains, which falls into powder on being shaken. This powder, after being washed, first with hot water and then with pure alcohol, consists of particles of copper, quite freed of any oxyd of the metal. Powdered copper may also be obtained by subjecting the black oxyd of copper, when heated in a flask, to a stream of coal gas, carried in and out by means of two tubes placed in the cork.

The system of laying railways without the use of sleepers, by placing the rails directly on the ballast, which has been in operation for some time past in Russia, is said to be quite successful. In that country it is a rule on the railways that every fifth wheel of a train must have a brake.

Telegraph Extension.

TELEGRAPHS IN SOUTH AMERICA.—Two telegraph companies have been organized recently in South America. The first, the "Compania Telegrafica Nacional," capital \$150,000, has obtained a grant to establish telegraph communication between the city of Lima and the port of Callao, Chancay, Huacho and Lambayeque, 150 leagues in length, with thirteen stations. The Government has advanced \$50,000, returnable in messages within ten years.

The other is the project of an American named Adrian S. Morse, and is designed to connect Lima and Callao with the rich guano islands of Chincha, the traffic in which, it is stated, amounts to over forty millions of dollars annually. This line will be 149 miles long, having its posts of steel, and using the Brooks insulator. This company is called the "Compania Telegrafica Peruana," capital \$150,000, and has received an advance from Government of \$25,000, payable in messages. Both these enterprises are to be started without delay, most of the material having been already provided.

We derive the above facts from an intelligent letter from H. J. Dinegro, Lima, to the *Telegrapher*, dated December 12, 1867.

TEXAS.—W. A. Wherry is constructing a line from Marshall to Waco—distance, 300 miles.

ATLANTIC & PACIFIC TELEGRAPH COMPANY.—The lines of this company have reached Erie, Pa., from New York.

71,688.—**INSULATING COVERING FOR TELEGRAPH AND CIRCUIT WIRES.**—Samuel C. Bishop.

I claim insulating telegraph and electric wires or conductors by means of valata or balata, substantially as specified.

71,927.—**APPARATUS FOR TURNING ON GAS.**—W. P. Wage, Barre Centre, N. Y., assignor to himself and M. Clarke, same place.

I claim, 1. The cylinder E, and the piston F, in combination with the lever D, or their equivalent, operated by the means and in the manner and for the purpose specified.

2. Lighting gas by electricity, in combination with the apparatus above described for turning on gas, as shown and described.

PHILADELPHIA, Dec. 24, 1867.

To the Editor Journal of the Telegraph:

I enclose copy of a telegraph bill rendered in Philadelphia in 1862, thinking you might find it interesting for your paper. It is about as funny as another I remember, as follows:

The Telegraph Company, Dr.
To Haulin the fort of July . . . \$5 00
Which meant of course that the hauling had been done on July 4. Yours truly, D. H. B.

August 27 the 1862.

he man wat had put up the Telligraft wire, Detter to Peter Schneider for Bording.

Johnson & Company.	
Dinners,	2
Suppers,	4
28 Breckfest,	6
Dinners,	4
Suppers,	6
29 Breckfest,	6
Johnson 3 meals at last at 10 per meals.	
Oct. 22, 4 meals more.	
Oct. 22, received the above in full up to date.	

PETER SCHNEIDER.

An Irishman, evidently a native of Germany, offered the following message for transmission from a town in Eastern Maine:

Michael murphy, New York.
Vy town you sent te coots? Sent fisites unt shaltz.
HANS KRAUT.

This was intended to mean, "Why don't you send the goods? Send visites and shawls."

The Destruction of Forests.

It is stated by scientific men that owing to the destruction of the redwood forests of California, crops this year have been almost a failure in the Coast range, and from other parts of the country similar disastrous effects from the absence of forests are reported. The western prairies are rapidly changing from wet to dry, and the climate from one of great evenness to one of suddenly alternating extremes. The few forests that fringe the watercourses have been rapidly thinned out. Evaporation that in old times was gradual and constant, now goes on rapidly, and as a consequence whole districts where water was formerly abundant now suffer from the want of it. Springs and streams once valuable for the water power they afforded, have dried up, and the once fertile fields are becoming barren. Alarm is felt in New Brunswick and the Canadas also at the extensive use of forests there for lumbering. In France the Government has recognized the necessity of the existence of forests in order to prevent inundations, and a law has been passed which appropriates ten million francs, to be expended at the rate of 1,000,000 francs per year in replanting woods and aiding that work. Two hundred and fifty thousand acres of new forest are expected to be the result of this appropriation. It would certainly seem to be incumbent upon the American Congress to take some action which would tend to correct this growing evil—or rather cutting down evil. Especially should the planting of trees upon the great Western plains be promoted.

Giving Joy to a Child.

Blessed be the hand that prepares a pleasure for a child, for there is no saying when and where it may bloom forth. Does not almost everybody remember some kind-hearted man who showed him a kindness in the dulcet days of his childhood? The writer of this recollects himself at this moment, as a barefooted lad standing at the wooden fence of a poor little garden in his native village, while with longing eyes he gazed on the flowers which were blooming there quietly in the brightness of a Sunday morning. The possessor came forth from his little cottage; he was a woodcutter by trade, and spent his whole week at work in the woods. He had come into the garden to gather flowers to stick into his coat when he went to church. He saw the boy, and breaking off the most beautiful of his carnations—it was streaked with red and white—he gave it to him.

Neither the giver nor the receiver spoke a word, and with bounding steps the boy ran home. And now here, at a vast distance from that home, after so many events of so many years, the feeling of gratitude which agitated the breast of that boy expresses itself on paper. The carnation has long since withered, but now it blooms afresh.—*Douglas Jerrold.*

The Grandeur of the Bible.

If you have ever tried it, you must have been struck with the few solid thoughts, the few suggestive ideas, which survive the perusal of the most brilliant of human books. Few of them can stand three readings; and of the memorabilia which you had marked in your first reading, on reverting to them you find that many of those were not so striking, or weighty, or original as you thought. But the Word of God is solid—it will stand a thousand readings; and the man who has gone over it the most frequently and carefully is the surest of finding new wonders there.—*Rev. James Hamilton.*

I have for many years made it a practice to read through the Bible once a year. My custom is to read four or five chapters every morning, immediately after rising from my bed. It employs about an hour of my time, and seems to me the most suitable manner of beginning the day. In what light soever we regard the Bible, whether with reference to revelation, to history, or to morality, it is an invaluable and inexhaustible mine of knowledge and virtue.—*J. Q. Adams.*

Interesting Electrical Phenomena.

Prof. Piazzi Smyth, in a note to the *British Journal of Photography*, a photographic picture, says:

"On the 21st of July I was trying the qualities of some newly prepared dry plates by taking a window view of house tops, and was surprised to find every chimney-top surmounted by a black streak or brush, i. e., black in negative, and therefore indicating light. Nothing of the kind was visible to the naked eye in the scene itself as a really existent fact, nor was any similar appearance visible on the ground-glass of the camera. The appearance, therefore, did not result from any bad action of the lens, which is a very good one. The stop employed was a small one (0.2 inches), and the definition of the developed picture was extremely sharp. Again, the appearance could not be caused by smoke coming from the chimneys, because that would hardly have been luminous; not 1-10 of the whole chimneys could have had fires below them, and either smoke or rarefied air would have drifted with the wind, which was blowing sensibly at the time, whilst the dark rays went upward straight as arrows. Again, that the chimneys as chimneys, had nothing to do with it, was shown by a similar brush or ray appearing at the top of a certain little ventilator in the roof of one of the houses shown, and not out of the parts emitting air, but from the ornamental spike at the top.

This circumstance convinced me at the time that the phenomenon was an electrical one, invisible to the eye, but abundantly visible or sensible to the photographic camera, and the occasion was perfectly agreeable thereto; for it was at the conclusion of a week of unusually hot, calm weather, and the sky had that morning become clouded with forms of clouds eminently electrical. Happily, the thunderstorm did not break in this neighborhood, being wafted away elsewhere, but had it broken here, the photograph tells exactly *when* the lightning was preparing to come down; and there is one tall iron chimney in the view, with the strongest ray of the whole above it, showing that *that* would certainly have been struck in preference to its neighbors, and, if unprovided with metal communication to the earth and water, would infallibly have caused mischief to the house to which it is attached.

"I have sent a second plate, taken six days afterward, when east wind and rain had disposed of all the electricity that had been brewing in the air; and it will be seen that although it is the same view, taken with the same camera, and with the same sort of tannin dry plate, there are no electrical brushes, or black rays, surmounting the chimney pots."

The process of galvanizing iron, as practiced in one of the leading establishments of Philadelphia is as follows: Selected sheets of iron, after being trimmed to requisite size and cleaned by a weak acid solution, are rolled smooth, then dried in an oven and each sheet placed in contact with zinc. Both metals are raised to unequal heat and thus fusion is effected. The regulation of the heat necessary to metallic combination is a point of nicety and care.

Mr. C. Tomlinson, of London, after a series of experiments arrived at the conclusion that the storm-glass was not acted on by light or atmospheric electricity, or wind, or rain, etc., but solely by variations in temperature; that is, that it is a rude kind of thermometer, vastly inferior to our ordinary thermometer, and has no meteorological value whatever. His position may be proved by dipping a piece of filtered paper into ether, and, placing it on to a bottle containing a little camphor, etc.; the cold thus generated will determine a deposit of crystals to any pattern or device we may choose to give the filtering paper.

Scientific.**To Polish Steel.**

Mr. Stoss, a German engineer, finds that oxide of chromium is the best substance for polishing steel. The article is easily procured as it is used for painting on porcelain; or it may be prepared by heating to redness the bi-chromate of potash. The neutral chromate of potash is formed while one equivalent of chromic acid is converted to chromic oxide, which is easily separated.

Preservation of Stone.

Messrs. Dent and Brown, of the chemical department, Woolwich, England, have successfully used oxalate of alumina for the preservation of the surface of limestone and dolomite. A solution made of a strength proportionate to the porosity of the stone, is applied with a brush. On limestone the result is the transformation of the lime into an insoluble and unalterable compound and the precipitation of the alumina.

The French Emperor is said to be very much interested in the recent invention for discovering water on the most arid land. He has bought the machine, and personally superintends the experiments. The instrument consists of a long iron tube, terminating in a sharp point, which forced into the ground it is said, has never failed within a few minutes to bring water to the surface.

A Remarkable Invention.

It is stated that a German glass maker has lately made a remarkable discovery. He has invented a telescope or magnifying glass, by means of which the most intricate nerves or vessels inside of the body may be seen from the outside. In fact the whole arrangement and action of the interior organs may, by means of this glass, be distinguished.

The discovery will probably be of immense benefit to mankind, as by means of it the physician will be able to determine with unvarying accuracy the nature of any particular disease, and the proper manner for treating the same.

The name of the inventor, who will probably realize a fortune from his discovery, is Gottlieb Juntz. He is very poor, but a well-read and highly intelligent man. He has an aged mother, an invalid wife, six children and a blind sister, all dependent upon him for support. His mother was well acquainted with the poet Goethe, and it was probably her many anecdotes of this illustrious person which first inspired her son with a desire to do something to win the respect and esteem of his fellow men.

The glass he has made will probably place him among the first rank of inventors, and win for him the esteem of whole nations.

By means of this invention he has already nearly cured his wife. Six months ago, a well-known doctor said she could not live, and pronounced her disease to be an affection of the heart.

Juntz, however, has now proven to him with the aid of the wonderful microscope that he was entirely mistaken; the stomach alone being the part affected.

We are eagerly looking for further information regarding Juntz and his wonderful glass.

The *Moscow Gazette* publishes the following:—"M. Bogdanowitch, who is making a journey of exploration in Siberia to study the possibility of constructing a railway in that immense province, has sent the following telegram from Omin: "The object of our expedition into Western Siberia has been attained; the information we have gathered shows by facts the brilliant future reserved for the Siberian railway. The co-operation afforded us by the Governor-general has produced an excellent effect in the country. At the commencement of the spring the line from Sarapoul to Tioutmen will be constructed at the expense of the Siberians. This route will be called the Russia, China-Taschkent Railway."

Telegraphers'**Mutual Life Insurance Association.****INCORPORATED UNDER THE LAWS OF THE STATE OF NEW YORK.**

I. This association shall be known as the Telegraphers' Mutual Life Insurance Association, and be organized under the general State law of the State of New York.

II. Its officers shall consist of a Treasurer and Secretary.

III. There shall be an Executive Committee of five, of which the Treasurer and Secretary shall be members, who shall exercise a general supervision over the affairs of the association and decide all questions which may arise.

IV. No officer shall, at present, receive any remuneration for his services.

V. No expense of any kind will be allowed except for expenses of incorporation, stationery, postages, circulars, certificates and advertising.

VI. Any person, regardless of sex or class, may become a member of this association provided they are or have been employed in the telegraph business and subscribe to these articles, and are unobjectionable to the Executive Committee.

VII. The initiation fee shall be one dollar and fifty cents, one dollar of which shall go to the contingent fund, and the balance to the expense account.

VIII. Upon the death of a member the Treasurer shall immediately, on application by the proper parties, pay over to them the fund which is on hand for that purpose, that is, the whole of the contingent fund on hand from the previous assessment.

IX. It shall be the duty of each member of this association to leave in writing, the name of his or her executor or heir, failing to do which the amount of insurance shall be used, first, to pay the expenses of burial, and the balance to be given to such relations of the first degree as are dependent on the deceased, or should there be none such, to be subject to the disposition of the Executive Committee for the benefit of the association.

X. Immediately on the decease of a member, the Treasurer shall assess each remaining member \$1, payable within thirty days of the issue of the assessment call, neglecting to pay which during the time specified, the delinquent shall forfeit all claims to membership or the benefits of the association, and he shall be restorable only on the unanimous vote of the Executive Committee and the payment of dues.

XI. A meeting for the election of officers shall be held annually during the first week in November in each year, who shall be elected to serve for one year or until their successors are elected. In case of the death of a member of the Executive Committee the remaining members shall have the power to fill the vacancy until the time of the annual election.

XII. Special meetings of the association may be called upon the written request of twenty-five members.

XIII. It shall be the duty of the Treasurer to receive all moneys, sign receipts, and pay bills and claims when audited by the Executive Committee. He shall give suitable bonds for an amount equal to twice the amount of money on hand at the time of his election.

XIV. The Secretary shall keep the records of the association, maintain such correspondence as is necessary with members, and issue such notices as may be necessary. He shall also aid the Treasurer in all matters in which he may require assistance.

XV. Certificates of membership shall be given, signed by the Treasurer and Secretary.

XVI. The books of the association shall always be open for examination by any member thereof.

J. D. REID, Treasurer.

D. R. DOWNER, Secretary.

W. O. LEWIS,

A. S. BROWN,

W. H. HILL,

Executive Committee.

DIRECTIONS TO APPLICANTS.

1. The number admissible as members of the Association at any one time, having been limited for the present to *fifteen hundred*, it is necessary to apply early if membership is desired.

2. Apply by letter, enclosing one dollar and a half and a three cent postage stamp for each application, to D. R. Downer, Secretary Telegraphers' Mutual Life Insurance Association, 145 Broadway, New York, and a certificate of membership will be sent by return mail.

3. Every applicant must be known to the Executive Committee, or to some responsible Manager of a Telegraph Office, and evidence of this, and of good character and of ability to work, must accompany each application. The endorsement of a reputable Manager will be regarded as denoting eligibility as stated, and the signature of the applicant, with date, amount and recommendation, will be all the form of application necessary.

4. Each applicant must file with the Secretary written directions respecting the disposition of the money to which he or she may be entitled at death.

5. No letters can be answered unless a stamp is enclosed for postage; and as the officers labor without compensation, correspondence requiring answers should be as limited as possible.

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Published on the first and fifteenth of each month, commencing with December 2, 1867, will be what its name indicates, a record of Telegraphic progress throughout the world.

Although issued from the executive rooms of the Western Union Telegraph Company, and liberally patronized by that Company, the discussion of all subjects of interest to the Telegraphic world will be left free in the Editor's hands, and treated upon their merits as these may commend themselves to him.

By the aid of a liberal supply of periodicals having to do with electrical science, and coming from different parts of the world, a valuable gleanings of matter interesting to all owning or using, or working or managing Telegraph Lines will be provided. In this the Journal will be much aided by correspondence from experts both at home and abroad, who will keep it fully posted on electric subjects.

What it will advocate, or what oppose, it is not necessary to say. Warmly attached to the business as one of the most useful agencies known to the world, its care and purity, and adaptation to the wants of civilization will be the pre-eminent design. All communities should feel that in the Telegraph they have a common interest, and that national greatness, universal peace, world-wide sympathy and social happiness is largely dependent on its use and possession. This feeling will be fostered as vigorously as it is felt.

To those holding stock in Telegraph Companies the JOURNAL should have value. It will not be an advertisement for everything which any Company does or designs, but it will convey from time to time exact and truthful information respecting its business and condition, which must make it acceptable to all in any way connected with its interests. Even to those who do not hold stock, and for mere purposes of information, the JOURNAL, furnished at so trifling a cost, should be an acceptable and essential part of their means of general information.

To managers and operators, and all engaged in the service, we can only say that our interests are the same, and no man feels the ties of brotherhood stronger than the Editor of this new medium of intercourse between us. We shall use our liberty freely and frankly and kindly, and shall be happy only as being the means of good and blessing to others. It is no part of our nature to abuse or destroy. But it may be our duty to speak positively of evils thoughtlessly engendered, with a view to the ultimate good of all. We shall claim liberty to discuss all things freely, yet hope never to say that word which shall needlessly cause offence. Those only who demand a monopoly of opinion will find the opportunity for dissatisfaction.

Correspondence, brief, practical, sketchy, sensible, will be received gladly.

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at the late Great Fair of the American Institute, N. Y., and their superiority is generally acknowledged by operators who use them. Aside from the advantages apparent upon inspection of these magnets, their acknowledged merits consist in the construction of the helix, which was patented August 15, 1865. This being of naked copper wire, so wound that the convolutions are separated from each other by a regular and uniform space of the 1-800th of an inch, the layers separated by thin paper. In helices of silk insulated wire the space occupied by the silk is the 1-150th to the 1-800th of an inch; therefore a spool made of a given length and size of naked wire will be smaller and will contain many more convolutions around the core than one of silk insulated wire, and will make a proportionably stronger magnet, while the resistance will be the same.

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JOURNAL OF THE TELEGRAPH.

NO. 6.

NEW YORK, FEBRUARY 15, 1868.

VOL. I.

NOTE.—This article has been delayed from number to number by uncontrollable circumstances. It refers to a subject which was fast bringing the use of the Telegraph into contempt. Much improvement has, of late, been apparent. Though the article has lost its freshness, it may yet do good.—E.N.

REUTER AND THE REPORTERS.

The Tortola Telegrams.

In that dim and forgotten past when the electric telegraph was not, those sanguine visionaries who are always looking forward to a radical regeneration of the species by strictly scientific means might have built—very likely did build, only the hypothesis is not worth the trouble of verification—a stately fabric of hope upon the benefits to be one day derived from an incredible rapidity of communication. Before the unerring and incorruptible utterances of the mysterious wire, all doubt and uncertainty were to flee away. As the world then was, no man knew of his neighbor's doings, save through messengers exposed from the first hour of their journey to the last, to all the weaknesses, physical and moral, that can befall humanity. A great battle was fought, and the nations whose political destiny turned on the issue had to wait for the news of it till tedious couriers traversed half Europe with their burden of dispatches. A great bank failed, and yet men of business to whom its stability was as the breath of life, went on buying and selling for days or weeks until the slow post brought the fatal letter. Wars were begun because nations had no means of knowing each other's disposition until time had added venom to the wound and explanations had lost their virtue. When the invention then in its infancy had been perfected, all these evils would disappear, and men would live in the light of one another's presence, knowing everything that happened from actual witnesses, almost at the moment of its occurrence. Instead of poring over the rapid details of events already half-forgotten by the actors in them, they would read the stirring narrative while the deeds it commemorated were but just performed, and be able to meet public or private misfortunes with all the promptitude of men who are on the spot when the need arises. Alike for knowledge and for action, the telegraph was to give us practical ubiquity.

Such was the dream. For a good many years past we have been in the enjoyment of the reality. Every morning Mr. Reuter benevolently scatters telegraphic crumbs of information upon our breakfast tables. Every evening he serves up the same enticing meal, with a layer of novelty superimposed to prevent our growing wearied with the repetition. In the case of the favored few, the jaded appetite is stimulated far into the night by the latest fragments of intelligence distributed over clubs and reading rooms. What has been the result of the change? Have the mists of error which once dimmed our sight been replaced by that calm assurance of knowledge to which the introduction of the telegraph was to give birth? It may rather be said that where doubt and uncertainty prevailed, now they much more prevail. The world of newspaper readers has resigned itself to a condition of absolute and universal scepticism. Formerly the truth, or at least some approach to the truth, was the first thing that came to hand. Now, when it comes,

it is already stale. Every kind of false rumor has had precedence of it. The honors of leaded type and prominent position are reserved, not for the fact of yesterday, but for the fiction of to-day. The people who read the real news of a paper are mostly the same people that read its advertisements—idlers to whom time is no object, or invalids to whom it is an object to be got rid of. For busy men, or careless men, or indolent men, the columns of telegraphic intelligence has supplanted everything else. If its contents were only consistent with themselves, there seems nothing that men might not come to believe on Mr. Reuter's authority. He has undisputed possession of at least twenty-four hours start over all competing sources of intelligence. Happily, considering the character of much of his news, he takes care to supply the antidote side by side with the poison. The material of his communications may usually be roughly divided into statements and contradictions; and the one is so continually interchanged with the other that it becomes impossible to make any intelligible distinction between them. On Monday we have a positive assertion, on Tuesday a distinct denial. On Wednesday, Monday's news is re-affirmed with qualifications. On Thursday, Tuesday's contradiction is pronounced to be correct in substance. Friday tells us, quite unnecessarily, that the whole affair is involved in uncertainty; and finally, Saturday makes a clean sweep of the week's work by characterizing statements and denials alike as pure inventions from beginning to end. And by way of relief to this tangled maze of telegraphic mendacity, comes last of all, a matter of fact government dispatch of the old sort, stating plainly what elements of truth have been day after day overlaid with all this ingenious web of fiction. This is the history of a telegram of the authoritative kind. There are a good many, of course, which escape such a fate, from the fact of their extreme vagueness. When a government is said to have done this or that act, or made this or that statement, we know what is intended to be conveyed, though we are quite aware that after a night's reflection our informant will eat his own words. But when the public opinion of a country or a party is summed up in a sentence, we are not able to attach to it any meaning whatever. Such telegrams remind us of the article of the Church of England that condemns masses "in which it was commonly said" that the priest did something or other—a censure the force of which has been a good deal weakened by the fact that people are not yet able to agree when, where, and by whom it was said. So, when some clerk in Mr. Reuter's office tells the listening world that the feeling in Vienna is strongly excited against the Concordat, or that the interview at Salzburg has caused great alarm to the German public, or that the attitude of the Republican party towards Mr. Johnson is sensibly modified, the news may be a perfect truism without our being any of the wiser, simply because we know nothing of the person who has formed the opinion of the sources whence he derives his intelligence, or of his qualifications for interpreting it accurately.

The Press Reporters who use the Atlantic cable have not been exactly deaf to the warning yielded by Mr. Reuter's experience. They have for the most

part resorted to an opposite policy, and, in the fear, we will assume, of giving us false news, have preferred to give us none at all. Still, when we remember all that, on the faith of speakers at public meetings, was to happen from the telegraphic union of the two continents, the result falls a little flat. The successful laying of the cable was to be a fresh link in the chain that binds together the great Anglo-Saxon family, to give new expression to each beat of the mighty heart that throbs with one pulsation on both sides of the Atlantic, and to perform sundry other functions of a similar kind. We do not know whether the philanthropic promoters of the undertaking are satisfied with the results that have been achieved. If they are, the conclusion necessarily follows that the bond which principally limits the several branches of the Anglo-Saxon family is the fact that 5-20's are selling at 108, and that the beat of common pulsation is daily quickened or lowered, as the case may be, by the latest prices of "petroleum—standard white." The Anglo-Saxon family has decidedly commercial tastes, but we almost question whether the public would not find a little general news equally acceptable. All through this year politics in the United States have been more than usually interesting, but the contributions to our acquaintance with them which have been received through the cable might really be numbered on the ten fingers. Morning after morning the *Times* greets us with the usual budget of announcements respecting the price of certain favored articles and the fluctuations in certain favored securities; and with that, by way of news from the United States, we are for the most part compelled to be content.

This week, however, we have had cause to regret our impatience. The cable was provoking when it played King Dog with us; it becomes a positive nuisance when it changes the part to that of King Stork. The telegram which announced on Saturday, "*The Island of Tortola has been submerged—10,000 lives were lost*," is by far the worse yet met with on either continent. Nothing could have been more ingeniously calculated to convey the least possible information and to excite the greatest possible anxiety. The original dispatch of such a message from Puerto Rico was utterly inexcusable, since, if it was believed that the island had been submerged, some fuller particulars must have been also received; or even supposing that the details were not obtainable at the moment, a delay of a few hours would probably have been sufficient to collect them. And, either way, the anxiety created by the news need not have been heightened by the additional anxiety of suspense. But at New York they contrived to make things worse. It appears from Tuesday's telegram that the form in which the news came in the first instance was, "*Tortola disappeared during a gale, and was submerged for eight hours; all living things perished*." At least the cable might have given the message accurately, and not tried to make the announcement more sensational by suppressing all mention of the gale, or of the reappearance of the island. As the message first stood, it was utterly impossible to conjecture whether it was true or false. Islands of volcanic formation have disappeared before now, and such a catastrophe would only have been the last and great-

est in a long series of similar events. But, as it was corrected on Tuesday, the message bears reckless inaccuracy in its very face. The total submersion of the island was reduced to a temporary disappearance during a gale—in other words, to a violent inundation of the sea.

Tortola is an island about twelve miles long. Its interior is described as a "mountain mass, broken up and furrowed by glens and ravines in every direction," and rising in its highest point 1,560 feet above the sea level. It would be quite impossible, without some investigation, to say how far up the hills the inundation reached, or what number of people might not have found refuge in their eminences from the advance of the sea. All that, under these circumstances, could have been surmised with any probability, when the telegram left Puerto Rico, was that there had been a very serious inundation, which had covered the low ground along the coast and probably destroyed many of the inhabitants. The romance about total submersion might have been reasonably suspected, when it was first forwarded, to be the fiction which it is proved to be, now that there has been time for intelligence to arrive through some more trustworthy channel than the reports of enthusiastic reporters by way of the Atlantic telegraph.—*Saturday Review*.

Correspondence.

Batteries and their Composition.

To the Editor Journal of the Telegraph:

JANUARY 29, 1886.

SIR—My attention has been drawn to an article in the JOURNAL OF THE TELEGRAPH for January 15, page 2, last column, and headed "Simplification of the Galvanic Battery."

The paragraph in question seems to be an extract from some European journal, but it is entirely erroneous.

The Daniells battery proper consists of two metals of different electro-motive forces—the one having more affinity for oxygen than the other.

The metals usually used are zinc and copper—the former has a much greater attraction for oxygen than the latter. If these metals are placed in water, pure and free from air, the electric current will cease almost entirely in the course of a very short time the deposition of hydrogen upon the surface of the copper rendering it almost as positive to the water as the zinc.

Mercury, which is much less positive than copper, should with zinc form a much more powerful battery, and so it does for one instant of time; but when it becomes fully covered with hydrogen it is thereby rendered temporarily as positive as the zinc, and the current is almost reduced to nothing.

Daniels' great invention consisted in ridding the less positive metal of this hydrogen by immersing it in a solution of itself, which, combining with the hydrogen, deposited a coating of that metal upon the "negative" element of the battery.

Suppose zinc placed in water to have the power of making that water positive to the extent of say 6, and copper under similar circumstances to have a power of making the water positive of say 2, and mercury of say 1, then if the copper be kept free from hydrogen the electro-motive force of the zinc-copper battery will be $6-2=4$.

The zinc-mercury battery, $6-1=5$.

The copper-mercury battery, $2-1=1$.

Now let us examine what takes place.

The copper plate is in a solution of sulphate of copper—the zinc in water. The sulphate of copper consists of one equivalent of sulphuric acid SO_3 in combination with one equivalent of oxide of copper $=Cu. O$.

The water consists of one equivalent of hydrogen in combination with one of oxygen $=H. O$.

On closing the circuit which permits the mysterious electric current to flow, a change takes place in the solutions—the zinc having more affinity for the oxygen than the copper, takes it from it leaving metallic copper, sulphuric acid and oxide of zinc, which two latter combine forming sulphate of zinc. When, however, the copper solution is all decomposed and all the copper is deposited, the action ceases.

If now the water in which the zinc was placed be examined, it will be found to be highly charged with the very sulphate of zinc, which the article in question proposes to use as a substitute for the sulphate of copper.

The absurdity will at once appear when a zinc plate is substituted for the copper one, for here there are two zinc plates each in sulphate of zinc opposed to each other, which way then is the current to go from plate *a* to plate *b*, or the other way?

Oh! but the writer may say the one plate is in sulphuric acid the other is in sulphate of zinc.

If he try the experiment he will actually find a feeble current, *but in the wrong way*, because the zinc is not pure, and the acid exposes these more negative points which give a very feeble current in the opposite direction.

It is worth mentioning here, that the addition of sulphuric acid to the zinc solution actually reduces the electro-motive force about eight per cent., unless the zinc be well amalgamated, or if the zinc have no impurity, the loss of electro-motive force will not be so great.

Professor Daniel rested content with his great discovery. Not so Professor Grove. He propounded to Nature this question—"Can we not get the sum instead of the differences of the forces?"

His experiments elicited the reply—"Put a material around the negative plate, which has a great affinity for hydrogen, and you will succeed." He tried oxygen in various forms, and also various negative electrodes, such as gold, platinum and plumbago.

The most potent method of applying oxygen to attract the hydrogen was that of coating the negative element with peroxide of lead. Next to that he found the highly oxygenized acids, such as nitric acid (NO_3). He likewise found that caustic potash, in contact with the zinc, was more powerful than sulphuric acid.

Other nations seem jealous of the honor so justly due to Grove, and hence, when the negative element of the battery is made of coke, they have the audacity of calling the battery by the name of Bunsen. The electropoleon battery is a Grove's battery, in which the oxygen is presented to the hydrogen by means of an oxide of chrome instead of an oxide of nitrogen.

I generally use in the Grove's battery, in the zinc cell, sulphate of ammonia; it renders amalgamation almost unnecessary, reduces local action, and does not weaken the action.

If nitric acid be used in the porous cell, then I add one sixteenth of liquid ammonia to the zinc solution, and then the fumes give no trouble. Nitric acid has less resistance than the bi-chromate of potash, and sulphuric acid and hence a larger volume of current.

Modify this battery as you will—first to Daniel, but mainly to Grove, is due the credit of this most powerful battery.

There is one peculiarity in the nitric acid form of Grove's battery worthy of mention, and which I have not found in any other. On passing the current through a small external resistance, the power, after the lapse of a minute or more, actually increases considerably in volume; the reverse is the case with all others.

Palmam qui meruit ferat.

Truly yours,

CROMWELL F. VARLEY.

Telegraph Keys.

To the Editor Journal of the Telegraph:

I have again to renew my plaint that nothing noticeable has been done in the improvement of transmitting apparatus during the last ten years. Before writing my last communication I had seen descriptions of the keys at the Exposition last summer, an account of the more prominent of which you published in your number of the first instant, but I do not understand how any of the ingenious machines of Siemens or Brequet are to be any use to us herein America. You are aware that although they are professedly "Morse" Keys, they are totally unlike what operators in this country are accustomed to, and necessarily so, as the Morse Telegraphs in the continents are worked with instruments which differ in everything except the more essential points. European lines use a different alphabet, in most cases polarized relays and with reverse currents. Nearly all the apparatus described in your last impression, are intended for these alternate positions and negative currents, and not one of them, except the late French "improvement" of using the original Morse Key, *could* work American lines as now built. Hence it is I claim that my former letter was substantially correct. In the experiments on fast writing which have lately been taking place, it is proved that a few, and how few, of our operators, can send legibly and rapidly, and it was to increase that number that the "New England Telegraph Club" (wasn't that its name?) was formed. The very, very great majority of operators are, however, detestable manipulators, and far more bulls are owing to this fact, than to the foolish professional pride of receiving without a break.

The friction of the pivots and the tension of the spring, varying through such wide limits, it needs a steadier hand and a more educated judgment than can possibly be possessed by the majority of operators, to secure both swift and correct manifestation with the keys as made at present. Besides being a cause of considerable resistance in the way of "escapes," the faulty manner in which the connection is made when the key is not in use, is continually the source of open circuits; especially on those way lines where there are numerous "plug" offices, and more particularly those belonging to Railway Companies.

There is an immediate and pressing need for a self-circuit closing key, in which the contacts shall be made firmly and surely, entirely independent of the superintendence of the manipulator; and this is certainly a more legitimate field for the inventive genius of our irrepressible operators, than that of insulation, which involving, as it does, a most profound knowledge of both experimental and mathematical science, has in some wonderful manner become a prime favorite with those who are in great measure totally destitute of either.

I understand that recently a self-circuit closing key has been patented by an Ohioan, although I have not been able to secure any intelligible description of it. My present and former communication has been written, not to introduce any invention, either valuable or valueless, of my own, but by agitating the question to secure to Telegraphers a better and more reliable instrument than they now possess, which latter, my own experience teaches me, is the source of the greatest annoyance to both employers and employees.

PHILADELPHIA, February 6.

New and Commendable Enterprise.

One hundred and ten employees of the Cleveland and Pittsburgh Railroad Company have organized at Wellsville, O., a Reading-room Association. S. B. Swain Secretary and Treasurer. We think we recognize in the name of the Secretary a telegraph companion of long ago. Success to the enterprise.

VOLTA-ELECTRIC INDUCTION.

Faraday vs. Mr. Buell.

To the Editor Journal of the Telegraph:

SIR,—May I be allowed to say that the experiment of your correspondent, M. V. B., on Volta-Electric Induction is not so conclusive as he would have us believe; and that there may be doubts expressed as to whether the "Incorrect views" of the rest of mankind are "corrected" in his letter? It is very well understood that the secondary currents induced in a conductor will themselves produce other induction currents termed tertiary and these yet other currents; and I think we are justified by the laws laid down by Faraday, in asserting that *theoretically* these currents are infinite in number, and that their union, if such a union was at all possible, would result in a continuous current, such as Mr. Buell would have us believe he has obtained, but we are not justified in assuming that practically there will be more than a momentary current at the instant of making, and a reverse current at the moment of breaking, contact with the battery.

Had Mr. Buell not been so desirous of proving induction, he would have at once seen that the effect produced in his sounder, was the result of conduction; in other words, that the primary and secondary wires were in metallic contact, and that, technically speaking, his lines were "crossed." If any proof was required to render it certain that such was the case, it is immediately and obligingly furnished by Mr. B., when to show the benefit which telegraphers might expect from his discovery, he states that upon disconnecting the secondary wire from the sounder, the magnetism of the original bar was increased, and this of course he assumes at once to be the work of the induction current, which he says is circulating in the secondary wire. Now, it is plain that the secondary, conveying the same current as the primary wire, and this by conduction would necessarily increase the magnetic effect of the bar about which it is wrapped, upon being disconnected from a great source of resistance, viz.: the helices of the sounder, because of the increased section of conductor (in this case nearly one-fourth, $\frac{1}{4}$), thus afforded the current, thus enabling it to convert into magnetism that portion of itself which was formerly doing duty in overcoming the resistance of the single, or primary wire. If Mr. Buell will therefore repeat his experiment with other coils, he will become convinced of the absurdity of his present results, which may be expressed in their plainest terms by saying that an induction current of high tension has a permanent magnetic effect on a coarse wire sounder, and but a momentary one on a magnetic needle.

T.

PHILADELPHIA, Feb. 6th.

The Nova Scotia Electric Telegraph Company.

This Company owns the whole of the lines in Nova Scotia and Cape Breton, with the exception of the line from Port Hood to Aspy Bay, built under its sanction by the New York, Newfoundland and London Telegraph Company, in 1856.

The lines of the Nova Scotia Electric Telegraph Company are all under lease to the Western Union Telegraph Company, the former retaining its organization as required by law. Capital at present, \$124,600, gold.

The annual meeting for election of Directors and transaction of other business, took place at the Secretary's office, Halifax, January 15, 1868. The report of the Executive Committee and the Treasurer's accounts were submitted and passed, and the following gentlemen elected to serve for the year:

EXECUTIVE COMMITTEE.

E. D. Meynell, Esq., President; Secretary and Treasurer, Chas. Twining, Esq.; Hon. R. B. Dickey, J. J. Sawyer, C. H. M. Black and Jesse Hoyt, Esqs.

The Galvanic Battery.

We had in use in our laboratory a most singular looking piece of apparatus, devised by Moses G. Farmer, Esq., the well known electrician of this city. It is a new form of instrument for converting heat into electricity, and most satisfactorily does it perform its work. All that is necessary to put it into active operation is to light a gas jet, and in a few moments the electrical impulses are manifested, and the battery is ready to be set to work. It deposits metals with great facility, and the development of the agent is constant and uniform so long as the heat is supplied. It resembles a "fretted porcupine" as much as everything we can compare it with. The metals employed in its construction are antimony and copper. The strips or arms of copper protrude outward from the bars of antimony, so as to secure the cooling influence of an air current, while the gas is heating the other extremity. A portion of the heat of the flame is transformed over into electricity, thus showing the easy convertibility of one imponderable into another, and the correlation of the forces.—*Boston Journal of Chemistry.*

Electricity in Schools.

We have just finished the reading of the account in the *Brooklyn Union* of the opening of the Adelphi Academy. The arrangements for comfort, convenience, system and effective teaching do more to characterize the progress of the age than any other of its significant signs. To one feature of the arrangement at the Adelphi, we call attention for its effectiveness and beauty. In each class or recitation room is a pleasant-toned gong-bell, which is rung by electricity, and marks the periods. Each hour is divided into three even periods. In the hall hangs a large clock, to which wires from batteries run, and then stretch through the building to every bell. The clock is so arranged that at every quarter hour the poles of the battery are brought together and the bells strike once—for warning. In five minutes thereafter, and to mark the end of the period, the poles again come in contact, this time twice in succession, and the bells are, of course, rung twice. All noise of gongs or heavy bells raising a clatter is thus avoided, and the idea of quiet impressed on the minds of the scholars.

Russian Line Redivivus.

Perry McD. Collins, Esq., the originator of the Russian Overland Telegraph, is preparing a project of a line from the Pacific coast, *via* Sitka, the Aleutian Islands and Japan to the Amoor. The Department of the United States Coast Survey are very desirous to take observations with Sitka, and Government aid will no doubt be given to reach that point. The route to Asia *via* the Aleutian Islands is a favorite one with the Russian Government, and was warmly advocated by Count Romanoff, the Russian Minister, as well as by Mr. Collins. The great improvement in the working of cables and facility in laying them is accelerating enterprises hitherto regarded as doubtful.

Opposition Lines.

In answer to enquiries of the extent to which opposing lines have been constructed west of New York, we answer:

1. The Atlantic and Pacific Telegraph Company have completed their lines from New York to Cleveland, *via* Albany and Buffalo, using two wires.
2. The Pacific and Atlantic Telegraph Company have completed their lines *via* Pittsburg to Cincinnati, using two wires.
3. The Southern Telegraph Company have two wires from Cincinnati to Louisville, Ky., and have poles planted in direction of Memphis to the State line *via* Bowling Green.

FASTER YET.—Mr. E. M. Shope, operator in Western Union Telegraph Office, Cleveland, sent 2,681 words in an hour to Edward Curry, operator at St. Paul, Minn. Distance 450 miles. Mr. Thomas S. A. Valiquet, Chicago, sent 60 messages, averaging 20 words each to Salt Lake City in 26½ minutes.

MR. A. W. ORTON, of the Western Union Telegraph Office, 145 Broadway, New York, whose marriage we recently recorded at Rome, New York, has accepted an offer to enter mercantile business there, and left the service in which he has so long and faithfully labored. We wish him abundant success.

MR. W. H. ALLEN for many years connected with the American Telegraph Company, a skilful operator and excellent man, has resigned his post to attend a brother in ill-health, on a voyage to the Mediterranean.

SIR DAVID BREWSTER, the pupil of Robison, Playfair, and Dugald Stewart, educated for the church but a scientific student by choice, inventor of valuable philosophical instruments, and of the familiar toy, the kaleidoscope—from the immense sale of which, owing to an evasion of the patent, he never received anything—and of the stereoscope, author of many profound works, principal promoter of the British Association for the Advancement of Science, and recognized the world over as a man of great ability and vast research, died on Monday, in London, at the age of eighty-seven.

UNSUCCESSFUL.—It appears that the scheme to buy out the Anglo-American Company has not been successful. At a meeting held in London, January 24, Mr. Wortley, chairman of an extraordinary meeting of the Atlantic Telegraph Company, complained of the Anglo-American Company as having obstructed the project and endangered its success. A new meeting was called for further consultation, on some day during the present month.

Electro-motive Scarf-pins—A Parisian Novelty.

A curious application of electricity has been made by M. Trouve, a jeweler of Paris. He makes scarf-pins with heads of men, monkeys, horses, dogs, or other animals upon them, which heads move their eyes at the will of the wearer. A single wire connects the scarf-pin with the electro-motor, which is usually carried in the waistcoat pocket.

Government Telegraphs.

Belgium has 5,895 miles of wires and 807 offices open to the public, or one telegraphic office for every 15,000 of population. Switzerland has 3,718 miles of wires and 252 offices open to the public, or one telegraphic office for every 10,000 of population. In the Dominion of Canada there are, according to Mr. Harvey's "Year Book," 9,040 miles of wires, and 497 offices open to the public—one telegraphic office to every 8,000 of population. These figures as to Canadian Telegraphs were compiled over a year ago, and as we before stated, large additions have been made within the past year, both to the number of miles of wire in use and the number of offices for public business.

It will thus be seen that private enterprise has with us so far achieved much greater results than governmental management in those countries before mentioned. As regards the tariff for messages we have been reminded that considerable reductions have been made in Canadian tariffs within the past year, amounting in some cases to as much as 30, and even 85 per cent. As was said in our former article on this subject, we trust that the Telegraph Company will soon find that still further reductions may be made to the advantage of all concerned.—*Canadian Monetary Times.*

Journal of the Telegraph.

This Journal will be issued on the 1st and 15th of each month, commencing with December 1, 1867. It commences with an issue of 4,000. The Western Union Telegraph Company have ordered 8,000 copies for its officers and offices. All its 5,000 stockholders will require it for information of interest to them. So of other telegraph companies and their stockholders.

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JAMES D. REID,
145 Broadway, New York.

NEW YORK, FEBRUARY 15, 1868.

Darien the World's Gateway.

In the part taken by Napoleon III to establish an Empire in Mexico, we were ever under the conviction that the protection of the Latin race under which it was inaugurated, and the establishment of the Empire itself, was only a cover to a more imperial idea. Louis Napoleon carried about with him in youth, in his exile, in his imprisonments, the ideas of empire, and those speculations on the influence of geographical configuration, which to his mind, determined the future of the world. A ruler by nature, and by the inspiration of the name he bore, the chart of the world came before his eye as a checker-board on which some day he was ordained to be an imperial player.

We are not the eulogist of the French Emperor, but we acknowledge profound respect for his mental grasp. Nothing has proven this so much as the publications written in his exile, or in the gloomy enclosures of the prison of Ham. One of the favorite of these ideas was in connection with the Isthmus of Darien. Recognizing the growing greatness of this Western World, the immense traffic with India, the swarming population of China, and listening to the creaking doors of Japan as they opened slowly upon a waiting commerce, his mind was impressed with the conviction that Darien, cut through by a ship canal, was to be the gateway of a vast international intercourse. It would have been his own had Imperialism under Maximilian become an established and recognized fact. Mexico was an imperial move for the possession of Darien. That move successful, France would have checkmated the world, and held Darien as one of its most kingly possessions.

The progress of the last few years has brought the commerce of the Pacific coast into greater prominence than ever. The growing greatness of California, the opening of steamship communication between San Francisco and China, the discovery of gold in Siberia, the rapid extension of telegraph lines along China and their projection into upper Asia to meet Russia on the Amoor, all these conspire to point to the West as the great region through which the industries of the world will be united and a vast commerce flow.

But our limits prevent more than a passing allusion to these things. We are led to what we have already said by the recent demands for telegraphic connection with the Bay of Panama, and to which we now refer.

TELEGRAPH TO PANAMA.

Initiatory steps have been taken to organize a company under the laws of the State of New York to connect the Telegraph lines of the United States with Panama, where already passes so vast a traffic with the Pacific Ocean, and which must become immense when the waters of the Gulf of Mexico are connected with the Pacific by a canal which must, before many years, be constructed. This line will

be laid *via* Jamaica from Cuba, and diverge from the former island to Panama on the one side, and the West India Islands on the other. At Panama this line will meet a cable already projected from Grenada and Chili; and, by the islands of the Caribbean Sea, must finally reach South America at Venezuela, connecting there with lines to Rio Janeiro and the Rio de la Plata.

The number of original corporators of this new enterprise will not exceed fifty, and be composed of persons whose names will be an assurance of integrity and success. Every corporator will be an actual subscriber to the stock, and no name be used, as is so often done, for the mere purposes of prestige or to induce others to invest therein. The object of the undertaking is to supply a great necessity, and will be prosecuted on a strictly cash basis from the beginning. No bonus for placing stock or other purposes will be permitted.

The various telegraphic structures now going up in South America under the helping hand of the governments there, give promise of an early connection with all the chief points in the South American Republics, and it is a matter of expectation that from some point on the Peruvian or Chilian coast, a cable will be laid to some point in India. Then will this patient world of ours be girdled with fire, and the sun that rises in the Orient blend with the rays which gather around its occidental decline.

The following gentlemen have consented to act as corporators and subscribers, for \$5,000 each:

D. N. Barney,	John Hoey,
Wm. T. Blodget,	Wilson G. Hunt,
J. W. Clendenin,	Charles Knapp,
James B. Colgate,	Marshall Lefferts,
Peter Cooper,	Cambridge Livingston,
W. B. Dinamore,	Johnston Livingston,
Wm. G. Fargo,	A. A. Low,
Cyrus W. Field,	William Orton,
David H. Haight,	Edward S. Sanford,
Alexander Hamilton, Jr.,	General Wm. F. Smith,
Charles Hoffman,	Moses Taylor,

Resigned.

Not long ago it was deemed necessary to organize a Bureau of Tariffs to systematize that most perplexing branch of executive labor in connection with nearly four thousand offices scattered over the entire country. It demanded patience, vast labor, good judgment, pertinacity. Colonel W. L. Gross, then Financial Agent of the Overland Division of the Western Union lines beyond Omaha, was called to its management, and for several months with the utmost assiduity, devoted himself to the Augean work assigned him. There was promise of a speedy simplification of this vital department, the inauguration of a system simple, thorough, adjustable, intelligent. In obedience, however, to a call made upon him recently to enter again the profession of the law in his native city, Springfield, Ill., Colonel Gross has resigned his duties as Superintendent of the Tariff Bureau, much to the regret of those who called him, and has re-entered legal life. Previous to his departure, Colonel Gross received the most satisfactory assurance of the appreciation of his labors here, and we regret the departure from among us of one so genial and true.

The New Auditor.

W. H. ABEL, Esq., formerly auditor of the American Telegraph Company, and since the consolidation of the Companies, acting as assistant Secretary of the Western Union Telegraph Company, now fills the Auditor's chair of that Company made vacant by Mr. Chapman's resignation. Mr. Abel brings youth, vigor, and a clear and active head into the service of the Company, in duties respecting which he has great familiarity and acknowledged competence.

The Executive Circular, respecting opening and closing of offices, will be found on page 7, having been crowded out of its proper place.

Frank L. Pope, in a graceful valedictory, has resigned the editorial chair of the Telegrapher. Mr. Pope was an able, industrious, and skilful man, whom we always held in the kindest regard, and for whose future we desire to join with all his friends in desiring that it may be sunny and successful. His successor is not named, but is understood to be Mr. Ashley, an attache of the New York press.

The *New York Herald* is amusing itself in endeavoring to make the public believe, that the Western Union lines are for sale, and have been offered to Government for sixty millions of dollars. We need hardly say it is false, and designed to accomplish purposes of its own.

The *Pall Mall Gazette* of the 17th January contains the following item:

"A proposal has been made for the submersion of a submarine cable between Callao, Guayaquil and Panama. Communication would be effected with Europe by this means in thirteen days, and this time would be reduced to a few hours if Panama were united to the Atlantic cable."

William M. Swain,

One of the founders of the Philadelphia *Public Ledger*, died in that city February 16th, after a long illness, at the age of 59 years. For eight years he was President of the Magnetic Telegraph Company, and many years a director in the American Telegraph Company. To us this death is the loss of a rare personal friend, one who, in dark days, stood by us our truest and firmest defence.

The publication of the following order has compelled us to lay aside much interesting matter, and greatly delayed our issue.

Atlantic Cable and Cuba Business.

EXECUTIVE ORDER No. 58.

Tariff and Rules for Atlantic Cable Business.
Furnished by the Anglo American Telegraph Co.

THIS ORDER SUPERSEDES ALL PREVIOUS INSTRUCTIONS.

All Messages Must be Prepaid.

Tariff in GOLD to any Point in Great Britain or Ireland.

	10 words or less.	Each additional word.
From New York City, Boston and the Provinces of New Brunswick and Nova Scotia, - - -	\$25 00	\$2 50
From all points in New England except Boston, - - -	26 00	2 58

All other points on the Western Union Company's lines will add to the rate from New York City, viz.: \$25, and \$2.50 their rate to New York City.

For example: the tariff from New Orleans to London on a message of 10 words is \$25—plus the tariff from New Orleans to New York, \$3.25. Total, \$28.25, gold;—on a message of 12 words from Washington to London, \$30—plus the tariff from Washington to New York, 87 cents. Total, 30.87, gold.

RULES FOR CHECKING, COUNTING, ETC.

RULE 1.—Checks.—You will state in the check:

- 1st. The Prefix. See Rule 3 concerning Prefixes.
- 2d. The number of written words in the entire message, including address, date and signature.
- 3d. The number of letters in the entire message including address, date and signature.
- 4th. The number of words charged upon.
- 5th. The amount charged.

RULE 2.—Counting.

The date, address and signature will be sent free to the extent of five (5) written words. Each word above five in the address, date and signature is to be counted as a single word without regard to the number of letters it contains. The number of words in the body of the dispatch will be determined thus:

- 1st. Count the number of written words.
- 2d. Count the letters and divide by five, regarding each five and fractional remainder as a word.

The greater number of words thus obtained will be the number of body words.

The entire number of words to be charged upon will be the number of body words thus determined, plus the excess of words above five in the address, date and signature.

The words allowed for address, date and signature cannot be used for any other purpose than the *bona fide* name of sender, receiver, place from and to, and date. It is absolutely required that the name of sender and place from, be inserted; but the date may be added or not at option of the sender. The sender is responsible for an insufficient address, and any corrections or alterations can be made only by a new message, which must be paid for.

Compound names of Countries, States, Islands, Cities, Towns, etc., and compound words, count as one word.

F. O. B. when written thus, "fob," counts as one word, but when each letter is separated thus, F. O. B., counts three words. C. F. I., or C. I. F., must be charged as three words, however written.

Numerals, whether expressed in figures or words, must be counted each numeral as a word—as 14865—five words, one, four, eight, six, five.

Count prices sterling under one shilling as twopence, threepence, as one word.

RULE 2.—Prefixes.—The check on each message must begin with one of the following prefixes:

Prefix 'M,' for ordinary mercantile messages,

Prefix 'C,' for cypher messages.

Prefix 'G,' for Government messages.

Prefix 'G. C,' for Government cypher messages.

Prefix 'P,' for ordinary messages with answer paid.

Messages prefixed 'G,' and 'G. C,' take precedence.

All other messages go in order of receipt.

RULE 4.—Cypher Messages—by which are meant messages consisting of letters, grouped or otherwise, not forming any known or dictionary words, or of numerals, will be counted, each letter or figure, as a word. When cypher is intermixed with plain words, the plain part of the message will be charged at ordinary rates, and the remainder as cypher.

RULE 5.—Government Cypher Messages must consist exclusively of numerals or letters, and not be intermixed with plain words. They will be counted as follows: If not in groups divide the total number of letters or figures by four (4), and regard each four and fractional remainder as a word. If grouped, count each group of four or less as one word—over four and up to eight, two words, and so on.

The address, date and signature of Government cyphers must be written in ordinary language. Each word will be counted as one word, and five sent free, as in ordinary dispatches.

These rates are for unrepeated Government cypher messages, and no claim respecting errors can be investigated.

Double rates must be charged if these messages are requested by the sender to be repeated.

RULE 6.—Packed Messages, by which are meant messages containing several separate messages combined as one, will be charged three times the ordinary rates.

RULE 7.—Abbreviations.—Words must be written in full. Abbreviations will not be allowed, except such as are in ordinary use, as Co. for Company, St. for Saint.

RULE 8.—Answers may be prepaid as follows: The sender must insert, immediately after the address, and pay therefor, the words "Reply — words, paid." The number of words paid for will be written in the blank space. Should the reply contain more words than the number so specified, the sender of the original message must pay the additional charge on its receipt. The reply must be presented for transmission not later than fourteen days after arrival of the original at delivery station.

RULE 9.—Repeated Messages.—Messages may be repeated back from the station to which they are destined to the originating station, for double tariff.

Should the receiver of a message require it to be repeated, on account of supposed error, the application for repetition must be addressed to the sending station. Such application and the reply must be treated as two distinct messages and be prepaid by the applicant. Should an error be discovered, the charges for the application and reply will be returned.

RULE 10.—Postages.—Messages destined for places beyond the line of telegraph must contain instructions from the senders as to the places from which they are to be posted; such instructions to be inserted immediately after the address, and to be charged for as a part of the message. Fifty cents, gold, must be charged extra for postage in such cases.

In messages for China the words "Post Galle," or "Post Kiachti;" in messages for Australia the words "Post Galle," and in messages for Gibraltar the words "Post San Roque" must be inserted and counted. The Galle route is best for

China business. Charge Ceylon rates on messages sent *via* Galle.

RULE 11.—Complaints.—All complaints respecting irregularity in transmission or delivery of messages must be made by the sender, in writing. In cases of delay or error, the complaint must be accompanied by the receiver's copy of the message. In cases of non-delivery, a statement in writing from the person to whom the message was addressed, to the effect that the message has not been received, must be furnished with the complaint.

The following notice is appended to the Tariff Sheet of the Anglo-American Telegraph Company (Limited):

NOTICE.—The public are informed that the Anglo-American Telegraph Company (limited) will not incur or accept any liability whatsoever, either for the due transmission of telegrams to the cable, or for their safe delivery at their destination; nor will they accept any liability arising from delay or stoppage, by reason of any accident to the cable or instruments. The company will not consent to be liable, under any circumstances, for any sum whatever, as damages or otherwise, for loss resulting from errors, mistakes, delays or other causes, in respect to any message entrusted to them, beyond the return of that portion of the charge accruing to the company out of the amount received, and then only in case the message should fall in transmission when in the hands of the Anglo-American Telegraph Company (limited).

TARIFF TO PLACES BEYOND GREAT BRITAIN AND IRELAND.

Messages to places beyond Great Britain and Ireland must be charged the following rates in addition to the tariff above stated:

For 20 words or less, including address, date and signature—
Havre, Rotterdam, Amsterdam, Antwerp, Brussels, . . . \$ 1 00
Paris, Cherbourg and the Channel Islands, . . . 1 25
Berlin, Vienna, Frankfurt, Hamburg, Brest, Bremen, . . . 1 50
Marseilles, Stockholm, Gothenburg, Copenhagen, . . . 2 25
St. Petersburg, Florence, Constantinople, Odessa, . . .

Christiana, . . . 2 50
Algiers, Madrid, . . . 3 50
Lisbon, Oporto, Gibraltar, Corfu, . . . 4 25
Tripoli, . . . 7 50
Alexandria, . . . 12 50
Cairo, . . . 13 50
Suez, . . . 15 63

To other places in following countries:

To points in Holland, Belgium, Switzerland, . . . 1 50
France, Prussia and Austria, . . . 1 75
Denmark and the German States, . . . 1 75
Russia, Italy, Turkey, . . . 3 00
Sweden, Norway and Greece, . . . 3 00
Algeria, Spain, . . . 3 75
Portugal, . . . 5 00
Turkey in Asia, . . . 6 13
India, China, . . . 26 25
Ceylon, . . . 27 50

For each 10 or fraction of 10 words above 20, charge in addition one-half of these rates.

Determine the number of chargeable words by count of actual words, and by count of letters, and division by five in entire message, including address, date and signature.

Compound names of countries, places, &c., count for as many words as they contain.

F. O. B., C. I. F. and C. F. I. must be charged as three words each, however written.

Two pence, three pence, &c., count as two words in each case.

In all other points, rules above stated for messages to Great Britain, apply.

Tariff and Rules for Cuba Business, furnished by the International Ocean Telegraph Co.—All Messages Must be Prepaid.

TARIFF IN GOLD TO HAVANA.

	20 Words or less.	Each add'l word.
From any office west of the Mississippi River, . . .	\$15 00	\$0 75
From any office in the Provinces of Nova Scotia and New Brunswick, . . .	12 00	0 65
From any office in New England, . . .	11 00	0 55
From any other office of the Western Union Telegraph Company, . . .	10 00	0 50

To places in Cuba other than the City of Havana, as per list, an additional charge, in gold, must be made, as follows:

For a message of 20 words or less, . . . 75 cents

For each additional 10 words or fraction thereof, . . . 25 cents

LIST OF TELEGRAPH STATIONS IN CUBA.

Batabano,	Los Palacios,
Bejucal,	Las Tunas,
Bemba,	Matanzas,
Boca de Sagua,	Pinar del Rio,
Bayamo,	Paso Real,
Consolacion del Sur,	Puerto Principe,
Colon,	Remedios,
Cardenas,	San Cristobal,
Cienfuegos,	San Antonio,
Caibarien,	Santo Domingo (Colonada),
Ciego de Avila,	Sagua,
Cuba,	Santi Spiritu,
Guanajay,	Trinidad,
Guines,	Union de Reyes,
Gualmaro,	Villaciara,
Jiguani,	

N. B.—Dispatches to points in Cuba, beyond Havana, are required by the Spanish Government to be written in the Spanish language. No responsibility will be taken on such messages if forwarded in any other language.

RULES FOR CHECKING, COUNTING, ETC.

RULE 1.—Checks.—The check must comprise:

1st. The number of words in the body of the message.

2d. The total number of words including date, address and signature.

3d. The amount of tariff.

In telegrams from Cuba, destined for Europe, the word Cuba must be added to the check.

RULE 2.—Counting.

Each word will be counted as a single word without reference to the number of letters it contains.

The date, address and signature must be counted and charged for.

The name of the place where the message originates, the month, day of the month, address and signature, must be included in every message to protect the several companies interested in its delivery. Should it be desired to send a message in which any of the above requirements are omitted, the sender must write below the message "Responsibility of Delivery Waived," and sign the same name or names as in the signature of the dispatch. The prefix 'R' must precede the check upon such messages.

All compound names and words count for as many words as they contain.

Figures and punctuation marks count each as one word.

RULE 3.—Official Messages of the Spanish or United States Governments will be charged less than the above rates by \$3.50 for each message of 20 words or less, and eighteen (18) cents for each additional word. All such messages must be signed officially and the prefix 'G' must precede the check.

RULE 4.—Code, Cypher and Abbreviations are disallowed by the Spanish Government.

RULE 5.—Postage.—Messages to be mailed to West Indian and Gulf Ports and South America require prepayment of postage, twenty (20) cents in gold.

ACCOUNTS.

Atlantic Cable and Cuba Business will not be included in the regular Monthly Account Current or Check Report. Keep an entirely distinct and separate record thereof, and at the end of each month forward promptly to the Auditor, New York, by express, the following:

ATLANTIC CABLE BUSINESS.

1st. A detailed statement of Sent Business, showing date, address and signature of each message, number of chargeable words and amount collected.

2d. A detailed statement of Received Business, giving same data, omitting amount.

3d. The originals of all messages sent and copies of all messages received.

CUBA BUSINESS.

1st. A detailed statement of Sent Business, showing date, address and signature of each message, total number of words, number of body words and amount collected.

2d. A detailed statement of Received Business, giving same data, omitting amount.

3d. The originals of all messages sent and copies of all messages received.

REMITTANCES.

Remit weekly, by express, to the Treasurer, New York, the entire amount of gold collected, with written statement giving date, name of your office, and amount for each day upon Atlantic Cable Business and upon Cuba Cable Business, separately.

WILLIAM ORTON,
President.

TERRIBLE TELEGRAMS.

I am of opinion that some place of residence should be provided for quiet, old-fashioned people who find it impossible to accustom themselves to the rapid and to them most obnoxious changes (misnamed "improvements") which are supposed to be essential to what is called progress. Cannot the Government set apart a suburb for our especial benefit; a place to which no local railway has yet penetrated? I don't know one in which, directly a few select inhabitants take quiet possession in the hope of remaining undisturbed by the restless, soulless, mechanical activity of the age, a speculative builder does not run up hideous streets of semi-detached villas, and form a colony of stockbrokers' clerks and aspiring tradespeople, who leave their shops behind daily at five o'clock. The consequence is, that to take these people to town every morning there is an omnibus competition which entirely excludes the original residents from all the inside seats; and, finally, a branch railway and a wretched, horribly new stone-and-stucco station disfigures the place; the best walks are cut up and spoiled; the streets are infested with hordes of navigators, who demoralise the laboring population and increase the number of the beer shops, and we are all scared by day and kept sleepless by night by the scream and rattle of the trains. The whole scandalous proceeding is consummated by the arrival of a telegraphic apparatus and the newspapers; nasty, closely printed, unwieldy, great broad-sheets, from which, if anybody ventures to read them—and it is what I could never bring my mind to do—the ink all comes off upon one's fingers and soils one's muslin dress. It is to the telegrams that I personally have the greatest aversion, however; not that there is any objection whatever to the curious discovery of the powers of electricity. The wonders of science, as exhibited at the Polytechnic, where I make a point of going twice a year, have ever been a source of gratification to me; and I would have them made useful in the instruction of youth at half-price; but nothing now is too high or too sacred for trade; or, as those who are ashamed to call it by its right name say, "for the advancement of commercial interests." Of all the modern inventions which have served to overthrow sentiment among us, to abolish refinement, and to use the results of a high material civilization for the purpose of establishing a mental and spiritual barbarism, I regard the Electric Telegraph as the worst. Telegrams (the very word is, I am told, a barbarous and illiterate jargon) are illustrative of what is called modern progress—of the progress which leaves everything best worth having behind, and for the sake of living faster, enjoys nothing. If they have not almost abolished writing, they have at least nearly put an end to epistolary correspondence. We get no letters now; only brief, uninteresting, and frequently ungrammatical communications, scrawled illegibly on a tiny scrap of flimsy tissue note-paper. Whoever receives a good, honest, earnest letter now-a-days?—a letter which the writer has sat down to as a labor of love, and warming with the task, has extended over a fair sheet of gilt edged post, and then crossed? In a few more years there will be nobody left who keeps packets of letters tied up with ribbon in secret nooks and drawers of their desks and bureaux. There will be no desks and bureaux, perhaps; no letters certainly; it will all be done by telegram, and an invitation will be sent an hour before dinner-time, with just "4.30 sharp" upon it; and the reply will be, "Yes, thanks." This, however, is sarcasm. It ill becomes me to satirize that which should rather be regarded with serious grief; for consider how much letters have had to do with the lives of people like myself; how almost every epoch in our quiet existence has been marked by epistolary correspondence. I never received but two of those dreadful telegrams in my

life, and one of them was delivered to me in mistake for somebody else. It contained only these words: "All right. A girl. Both doing well."

It gave me a dreadful shock, for I remembered how the advent of a little stranger in our family had always been accompanied by a series of observances which indicated that an immortal being had been ushered into the world. There was first a white kid glove on the knocker, then a cushion stuck with pins of welcome, next the solemn whispering reception of visitors by the young mother, who sat up in a lace cap and a large white shawl; and of half-crowns by the nurse, who assiduously produced light refreshments on the occasion; then there was the christening, with white favors and a quiet party; and a silver mug, a papboat, a coral and bells from god-fathers and godmothers. All these ceremonies were the occasion of letters which kept alive family affection, and made life something more than a mere passing reminder, and time worth a better record than the mere memorandum of a railway clerk.

Letters were a part of the observances of society in those days. There were proper seasons and occasions for them, quite independent of anything happening which required to be communicated—at Christmas-tide especially, and on New Year's Day, and birthdays, and on hearing incidentally of some piece of good fortune or any sorrow which had overtaken a friend. I hope we have not yet reached such a pitch of brutality that we could communicate by telegram on any of these occasions, giving our secret thoughts and tender sympathies to the ear of the clerk, and sending them briefly in a couple of lines. I remember even in my school-days how much letters had to do with our daily life. There were the letters that we got from home with the cake and the parcel of fruit, the new writing-desk and the box of toys. Then there were the holiday letters, written just before the breaking up days, wherein we were supposed to write the sentiments of our hearts by beginning "My dear Parents," and declaring our hope that we should "ever be mindful of the constant love and care" bestowed upon us by our dear friends, and "of the inestimable advantages to be derived from the pursuit of those studies to which we were directed by those to whom the care of our education was intrusted." How well I remember the old formula! I have some of my own letters in my desk now, along with those others—those mournful, deep-black-bordered ones that came to me with the first great sorrow that almost laid my life low; but which, coming as messengers of terrible intelligence, had yet something of healing in their wings, because of the love and compassion that dwelt in the words by which that awful message was conveyed. The ink is all brown and faded now, but the remembrance of the sorrow lives, the remembrance of the sorrow and of the tenderness, both of which can be recalled, as it were, in their first freshness by a glance at those blurred and paling characters.

I don't know why I should have grown so garrulous, even though I have lived to be an old maid. Yes, I have one of those other letters in my secretary—letters that tell of the heart's devotion, and of which some of my friends have received so many, and have allowed me to participate in their joy, not always lasting. I might have had, but it was not to be. There came to me one day a black-bordered messenger instead of a white-winged dove, and the page that might have been opened in my book of life was closed forever. I will not think of that now; not that the thought gives me pain. But I have gone quite away from the subject of telegrams. I said I had only received two. The second was from my dear niece Bertha. Her parents live in the country, and I have ever tried to act to her as though she had been my own daughter. She is a fiery, imperious creature, for she was a spoiled child always, and very, very beautiful, I think. So William

thought; for she no sooner left school than he wanted to marry her, and married they were before she was twenty years old. I thought it would have been better for her to have had some household or domestic training first; but that, it appears, has gone out of fashion too. At all events, as her future husband had a good business in the City, they obtained her parents' consent; and my only fear was that her passionate temper might be a trouble to her. Fortunately William was one of the best of men—slow, but with an amiability that nothing could ruffle, and a fine constitution. They were a handsome couple, and I gave them all my old silver tea-service, and the best spoons, for a wedding present.

They have been married now very little above six months, and I have more than once had occasion to warn Bertha not to give way to her temper, or to try her husband's affection too far. Judge, then, of my surprise, my almost horror, when, the day before yesterday, I received a "telegram" from Bertha, saying no more than—"Dear Aunt, come to me at once; I am so miserable."

You might have knocked me down with a feather; but I sent Hannah for a fly—she brought a cab, and it was full of muddy straw, and somebody had been smoking tobacco inside it—and drove off to Barbarossa-villas at once. What could have happened? When I got in Bertha flew into my arms and became hysterical.

"What—what is the matter, child?" I exclaimed. "Nothing between you and William, I solemnly hope and trust?"

"I—I was very wicked, and behaved so badly to him this morning; and I deserve it all, and I am a wretch. But oh! how could he be so cruel?" she sobbed.

"Why, what has he done?" said I, in dismay.

"He went away without a word, or, at all events, I didn't listen, for I went into my own room, and banged the door; but look—look there!"

I saw what it was—a telegram. Oh, how I loathed the sight of the wretched scrap of blue paper, with its red letters! This was it:

"It is too heavy for me. I can not come; but it will be brought home to you, and you will have to pay for it."

What was to be done? I tried to cheer her; told her to hope for the best; that he had sent that hateful message in the heat of passion, which would have subsided over the rational employment of writing a letter. It was with difficulty that I could get her to take a cup of tea. Wearily the hours went on—eight, nine, ten, eleven, midnight—and she sat there dumb, weeping, almost heart-broken.

Suddenly there was the sound of a key in the lock of the street-door, a foot upon the stair, and her husband burst into the room. He looked with surprised inquiring glances from one of us to the other. With a great cry Bertha sprang into his arms, her face upon his shoulder.

"So you have forgiven me, dear William! you have come back!" she said, in broken accents.

"Come back!" he replied; "of course I have. What ever is the matter, my love?—you got my message, didn't you?—and the turkey's in the passage, I see. You've paid for it, haven't you?"

"Paid for it!—oh, William! Yes! no—what do you mean?"

"Please, ma'am," said the servant-girl, who came in at that moment, "I wished to tell you as the man that have brought the turkey he's my fust-cousin, and I asked him to step into the kitchen, ma'am, till sech times as you was recovered sufficient for to pay for it."

"I'll go and see to it," said I, and went out of the room, leaving the young couple together.

COMPLETED.—The Burlington and Missouri River Railroad Telegraph line, between Burlington and Osceola, Ia.

L. G. TILLOTSON & CO.,
26 Dey Street, New-York,
MANUFACTURERS OF
TELEGRAPH INSTRUMENTS
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MATERIAL OF EVERY DESCRIPTION.

We invite all Telegraphers to a close inspection of our Work.

WE ARE PREPARED TO CONTRACT FOR THE ENTIRE
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OUR WORK WILL BE DONE PROMPTLY,

And it is particularly requested that any goods sold and recommended by us, not proving satisfactory, SHALL BE RETURNED.

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Or any other, excepting such as we know to be of inferior quality.

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Make, beyond question, the most perfect Battery yet produced. We have abundant testimony of their GREAT SUPERIORITY OVER ANY OTHER.

We particularly invite attention to our whole arrangement of the

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Proving, as it does, that as much strength may be obtained from this Battery as the Grove, with far less expense.

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THE FIRST PREMIUM

at the late Great Fair of the American Institute, N. Y., and their superiority is generally acknowledged by operators who use them. Aside from the advantages apparent upon inspection of these magnets, their acknowledged merits consist in the construction of the helix, which was patented August 15, 1855. This being of naked copper wire, so wound that the convolutions are separated from each other by a regular and uniform space of the 1-800th of an inch, the layers separated by thin paper. In helices of silk insulated wire the space occupied by the silk is the 1-150th to the 1-300th of an inch; therefore a spool made of a given length and size of naked wire will be smaller and will contain many more convolutions around the core than one of silk insulated wire, and will make a proportionably stronger magnet, while the resistance will be the same.

BUNNELL'S REPEATERS,

lately patented, and now pronounced the simplest and best extant, furnished in splendid style.

PRICES.

Relays with helices in bone rubber cylinders, very fine.....	\$19 50
Small Box Relays.....	16 00
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Medium Box Relays.....	17 00
Same in Rosewood.....	18 00
Large Box Relays.....	18 00
Main Sounders same as the above, with heavy armature lever, without local connections.....	75 cents less
Pocket Relays, with all the adjustments of the above and good Lever Keys.....	22 00
Excellent Registers.....	40 00
Pony Sounders.....	6 75
Keys.....	4 50 to 6 50

All other appliances made to order. Extra spools for replacing such as may be spoiled by lightning, furnished at \$1.25 each. Old spools taken at the price of new wire by the pound. Goods sent to all parts of the continent with bill C. O. D. Or, to save expense of returning funds by express, remittance may be made in advance by certified check payable in New York, or Post-office orders, in which case he will make no charge for package.

He has ample facilities for furnishing all other kinds of Telegraph Supplies at the lowest manufacturers prices.

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MANUFACTURERS OF

GLASS INSULATORS, ALL PATTERNS.

Zincs, Porous Cups, Platinum, Acids, Quicksilver, Tumblers, Coppers, &c. All of the most approved Pattern and Best Quality.

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MESSAGE PAPER (in strips).**

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ON HAND AND FURNISHED TO ORDER.

WIRE, GALVANIZED AND PLAIN

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Lowest Manufacturers' Prices.

COPPER AND BRASS WIRE
OF ANY NUMBER REQUIRED.

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GUTTA PERCHA or COTTON COVERED,
AND

MAGNET WIRE.

**REGISTERS,
RELAY MAGNETS,
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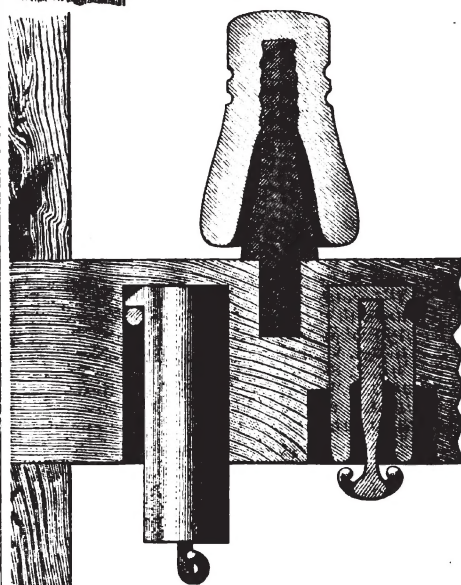
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